

# SUPPLEMENT.

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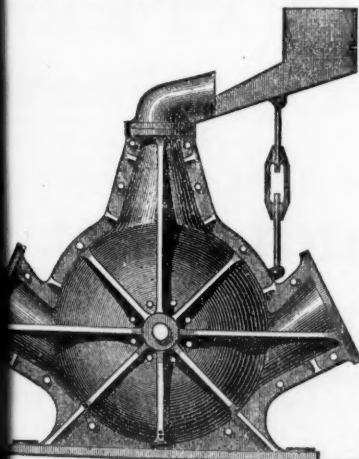
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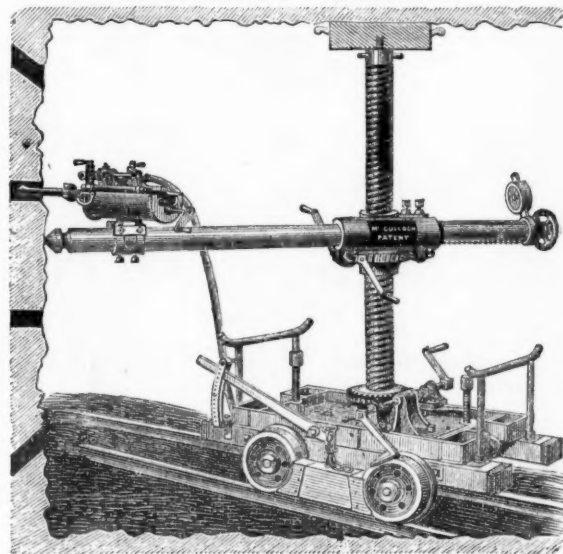
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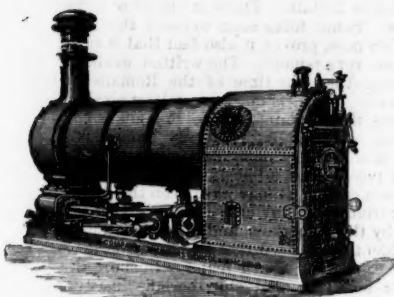
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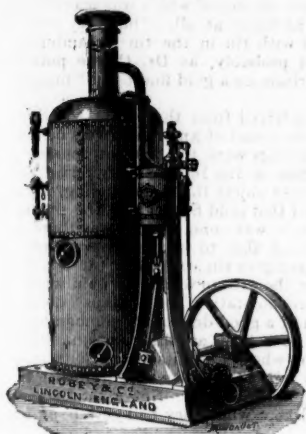
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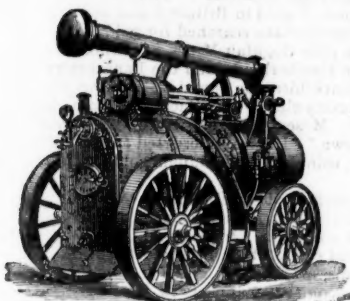
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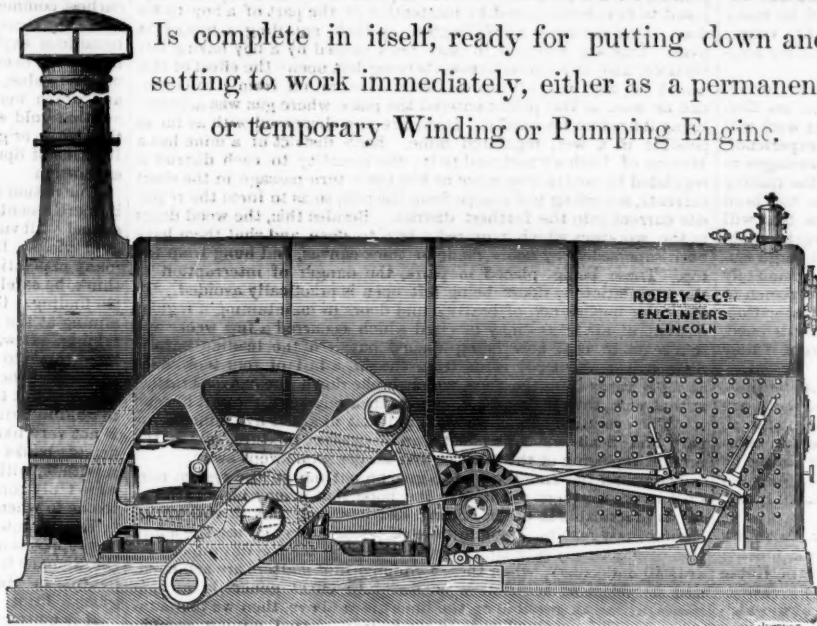
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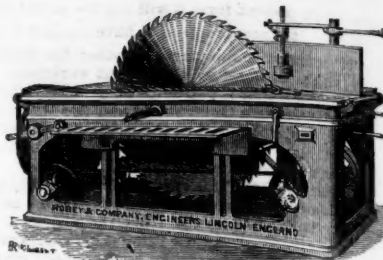


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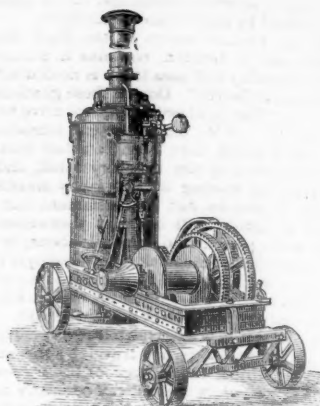
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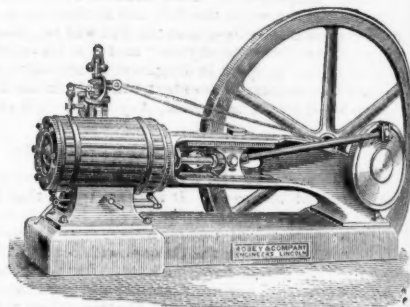
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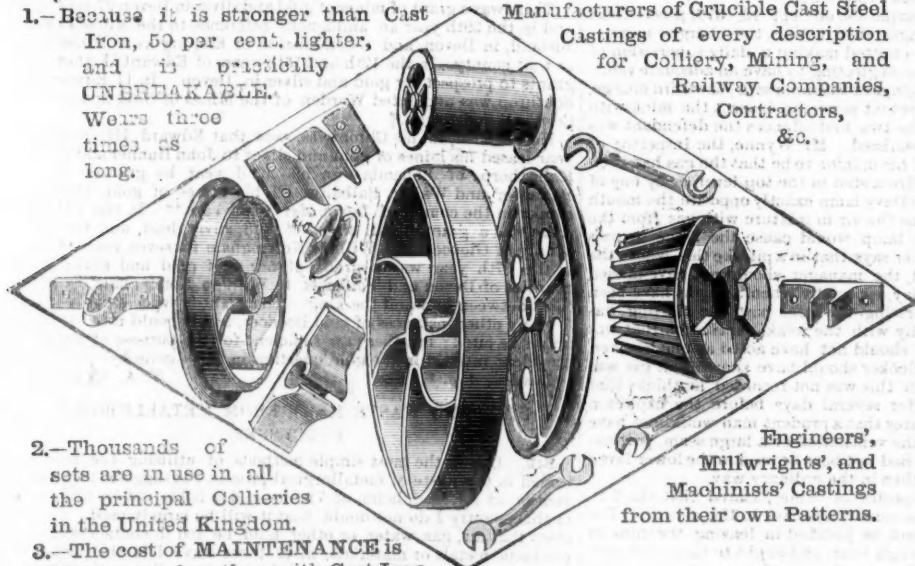
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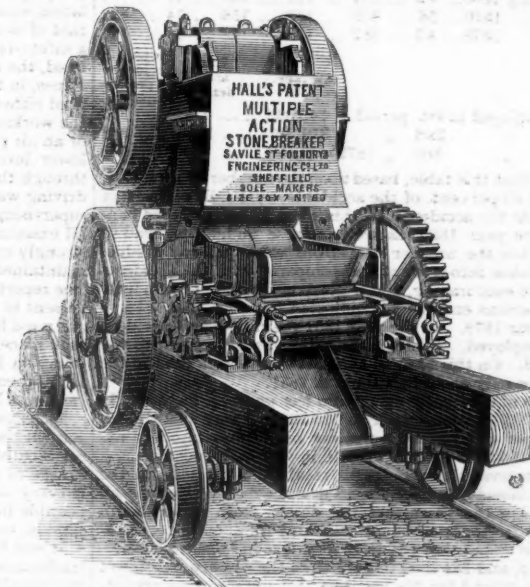
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## Original Correspondence.

## EMPLOYERS' LIABILITY.

SIR,—The name of the Employers' Liability Bill will naturally commend itself to the great mass of workmen, but if it should be passed in its present form it will involve a vast amount of legal complication. It is now proposed to have one law for the general public, one for common employment, another for domestic servants, and, lastly, an exemption for Government workmen. It apparently is a grave injustice that if two ships of precisely the same character are being built, one in a Government and the other in a private shipyard, and workmen are injured in the execution of both works; one set of workmen may receive compensation, while those employed in the Government yard have no claim.

Mr. Burt, with the frankness and honesty which have distinguished his Parliamentary career, has stated that few accidents occur in the North of England that arise from the negligence of managers. It is generally believed that the same careful supervision exists throughout the country. No examples have yet been given of the negligence of employers as a reason for the adoption of a Bill that will undoubtedly jeopardise accident funds, mutually established in many large industrial pursuits. Employers cannot be expected to voluntarily pay to accident funds, and at the same time be liable for accidents caused by one servant to another.

The last printed report of the High Bailiffs' Association, which recently met in London, contains a paragraph—"Should the Employers' Liability Bill pass there is no doubt that important work will accrue to our Courts." One of these gentlemen, of great experience, writes me, "The legal profession are alive to the great advantages in store for us." If Mr. Gladstone had introduced the Bill the trading community would have been satisfied that the question had been fully considered by him in every detail, and the injustice that will arise from the passing of this hasty measure would have been obviated. To pass an Act of Parliament out of which all large employers of labour will contract themselves, as well as ultimately almost every person who employs labour, by compelling workmen to sign an agreement exempting the employer from personal obligation, is a kind of legislation that will before long be universally condemned, as it must involve a large number of small contractors in ruin if they do not contract themselves out of the Bill.

The law as it now exists as to railway compensation is indefensible. If a pauper and a bishop travel by the same train, and both are injured or killed, the pauper or his representatives can claim no compensation, while the railway company may have to pay an enormous sum to the bishop or his representatives. There can be no doubt there ought to be a general law for compensation. Why domestic servants should be exempted from the Bill is an anomaly and injustice it is impossible to understand.

The hasty discussion that has taken place in Parliament has shown that grave difficulties exist in the settlement of this complicated question. Employers of labour cannot expect or hope that the House of Lords will throw out the Bill, and at this late period of the Session it is impossible to believe that the Bill will be passed in a form which will give satisfaction to anyone; and it is inevitable that large sums of money must be spent in litigation which ought to be appropriated, through the medium of accident funds, to injured persons.

Staveley Works, Chesterfield, Aug. 9. CHARLES MARKHAM.

## MINERS' SAFETY LAMPS.

SIR,—I have read the letter of your correspondent "Collier," in the Journal of last week. It appears to me that his letter is written as a sort of advertisement for Messrs. Bennett and Solomon, whose lamp I never heard of before, although as a miner I have had some experience. I am sure the Colonel will read "Collier's" letter in the right light, and not hold back any further information from the public as to his, in my mind, simple and good lamp. Never mind the corkscrew. It is better to have anything than the state of things at present. I think if some of our "Colliers" had the education and passed such an examination as the Colonel has had to pass, and with Colonel Shakespeare's experience, it would be a great boon to the public and poor pitmen who are losing their lives so often.

Forest Hill, Aug. 11.

R. G. S.

## THE PREVENTION OF COLLIERY EXPLOSIONS.

SIR,—The frequency of colliery explosions—often accompanied with great loss of life—is a subject we have still to deplore, and this notwithstanding the great advances in the mode of ventilating mines in recent times. But while these improvements have been made, though the production of coal has been increasing almost every year, the loss of life has not decreased as we should have expected from the remedial measures that have been brought into action by the Legislature, and the superior skill and carefulness almost generally exercised in the working of coal mines. From a table recently published the number of fatal accidents in recent years is as under:—

Average each year.	Explosions of fire-damp.	Falls of roof & side.	In shafts.	Sundries under-ground.	Sur-face pits.	Total.
For 10 years ending 1860...	82	361	184	100	47	774
" " " 1870...	56	403	133	156	74	822
" " " 1879...	40	392	113	158	78	821
Average.						
No. of persons employed in 1st period...	246,032	774	317			
" " " 2nd " "	319,240	822	388			
" " " 3rd " "	433,690	781	555			

It will be seen that this table, based upon the number of accidents, shows that about 50 per cent. of the accidents were falls of the roof and sides, and that the accidents of this class have increased considerably since the year 1850, as well as those under the head of sundries. But when the number of persons employed and production of coal are taken into account and compared with the accidents the result is more encouraging, and a gradual decrease of accidents compared with persons employed is indicated from the year 1850 to the end of the year 1879. In the year 1851 the ratio was 1 accident to 309 persons employed. In 1879 the ratio was 1 accident to 609 persons employed. On this basis of comparison the accidents in the last year would be only about half those in 1851.

The production of coal in Great Britain has gone on increasingly from about 62,000,000 tons in 1851 to 133,720,393 tons in 1879, an increase of 116 per cent., and the number of persons employed has increased from 216,217 in 1851 to 476,810 in 1879=121 per cent.

It should be observed that the deaths resulting from falls in the mine and those classed as miscellaneous average nearly one to each accident in the last two years, but the deaths from explosions in 1878 average nearly 19 per accident, and in 1879 about 5 per accident. When it is stated that 586 lives were lost in 1878 from explosions of fire-damp, and 184 lives in 1879 from the same cause, this of itself is sufficient ground for the assertion that some further precautionary measures are urgently required to place the working of coal mines in a more creditable position.

It may be asked why the loss of life from explosions in 1879 should have been only 1 in Northumberland, Durham, Cumberland, and Westmoreland, while in South Wales the loss of life was 70, concurrently with a much smaller output of coal? In Yorkshire the loss of life was 31, and in the Eastern District of Scotland 32. It may be asserted that the mines of Durham and Northumberland are worked in a much more careful and skilful manner than they were 30 or 40 years ago; the records of accidents during the last 50 years will bear out this statement, and when the large output of coal of late years is taken into consideration there must be something worthy of imitation in the principle of carrying on these collieries which might form a groundwork of regulations that may be applied to other mines and districts where less favourable results are obtained. Considering the importance of this question it cannot be too

strongly urged on the attention of all concerned that what has been accomplished in the Northern Counties in the way of immunity from explosions may, with the exercise of the same care and skill, be accomplished in other districts, where immunity from explosions is far from being yet attained.

The system of the Northern Counties, in which is included measures for an abundant supply of fresh air, its frequent division and distribution into every working place in the mine, daily supervision of the workings by an underventurer and overmen, with a staff of deputies whose duties are to keep in order a district of the mine assigned to each, these duties consisting of timbering and bratticing the working places, laying the roads, setting doors, and exercising a general supervision over the men and lamps, the latter being carefully examined and locked by the deputy in each district at the station, beyond which no candles, as a rule, are allowed to be taken. Where the board and pillar system is adopted every working place is freely bratticed. The overman or deputies must examine carefully every place before the men are allowed to enter. No accumulation of gas, even in small quantities, is allowed to take place. Should such occur measures are at once taken to have it swept away. The setting and keeping in order of doors forms an important part of the duties of deputies; formerly doors for the conveying of air into the various workings were of wood, each door or pair of doors being opened and shut by a boy appointed for this purpose. Several explosions in these days are supposed to have been caused by inattention on the part of a boy to his door. One occurred at Willington, in 1831, entailing a loss of 34 lives. This was believed to have been caused by a boy having left his door, and, as a consequence, its being left open: the effect of this would be that part of the workings were cut off from ventilation, and as soon as the putter entered the place where gas was accumulating it fired on his candle. Doors are now dispensed with as far as possible in a well regulated mine. Each district of a mine has a division of fresh air assigned to it; the quantity to each district is regulated by contracting more or less the return passage in the short currents, according to distance from the pits, so as to force the requisite current into the furthest district. Besides this, the wood doors in the workings which required a boy to open and shut them have been superseded by doors made of thick canvas, and hung from the top. These being placed in pairs, the danger of interruption of the ventilation by doors being left open is practically avoided. To show the importance of brattice and doors in maintaining a regular current of air a case may be cited which occurred a few weeks ago in a seam of coal now being opened out. In the leading narrow drift, driven about 200 yards from the pit, a fall of roof took place about 8 yards from the face, which broke down the canvas brattice at that part, thus laying dead, as regards air current, the part beyond it. The evolution of gas was so rapid that in about five minutes the part laid dead was filled with an explosive mixture, which the prompt replacing of the brattice and timber soon swept away.

The writer has endeavoured to give an outline of the system pursued in the northern counties in the hope that it may be adopted as far as practicable in other mining districts, and that it will afford similar good results. The questions of lighting fiery mines, the adoption of practically safe lamps, and prohibiting the use of gunpowder, are still undecided; when these two important matters are arranged, and a system of ventilation carried into effect generally in coal mines, as far as possible on the lines given above, then we predict a new era will be entered upon in the history of coal mining, and explosions will seldom if ever occur. Is it not a standing disgrace to us as a nation, in this age of science, that explosion should succeed explosion without apparently any remedy being applied to put a stop to them effectually? No laxity in discipline, or primitive system of ventilation should be tolerated in coal mines, and that this should not occur frequent inspections are required by impartial persons, to take a general view of the ventilating arrangements, to see that daily supervision of the superior officer is indicated by skilful laying out of the mine, and ventilating it so that fire-damp as evolved from the coal is properly dealt with and accumulations of it are never seen. An account of an explosion of fire-damp at Leycett Colliery, in Staffordshire, is given to show the manner in which some collieries are carried on. This explosion occurred on Sept. 12, 1879, causing the death of eight persons. The mine was stated to be ventilated by heat, and 10,500 cubic feet of air per minute passed into the workings, which were not, however, extensive; the explosion was of a violent character, showing that a large quantity of fire-damp had accumulated. The "butty" system is in operation here; the evil of the system was that the butties, besides being contractors, acted also as underlookers and firemen. This disaster occurred in the 7 ft. Banbury seam, probably the most fiery in that district. The dip of the seam varied from 40° to 90°, or vertical, so that it will be seen these two circumstances present formidable obstacles to be overcome in the proper ventilation of the mine, requiring bratticing and attention to matters of detail to be the more important under such conditions. Unfortunately another explosion has since occurred at the same pit on Jan. 21 of this year, causing the loss of 62 lives. A blow-out shot acting on an inflammable air current was the cause assigned for this accident. This took place under new management, although a ventilating fan (in progress of erection for two years) had been set to work three weeks after the first explosion.

With reference to the first explosion on Sept. 12, 1879, proceedings were taken against the manager then acting, the charges being—first, that for 10 days he had omitted making a daily supervision of the pit; the second charge was neglecting to have an adequate ventilation, so as to render the workings of the mine safe; the third charge, that of not appointing a competent person to inspect the mine with a safety-lamp. For each of the two first offences the defendant was fined, the third charge was dismissed. Mr. Wynne, the Inspector of Mines, in his evidence, stated his opinion to be that the gas had been fired either in attempting to fire a shot in the top level, or by one of the workmen having hung his Davy lamp exactly opposite the mouth of an air pipe, by which means the air in mixture with gas from the lower levels blowing on the lamp would cause the flame to pass through the gauze. He further says that in a pit like this, where the driving was in virgin ground, the manager should not have missed supervising more than one day, especially when it might have been all examined in an hour. Driving the level past the thirling was strongly condemned, especially with the weak ventilation that was maintained. The contractor should not have acted as underlooker. The report-book of the underlooker should have shown that gas was present in the places. Though this was not recorded he thinks that gas must have been present for several days before the explosion took place, and further he states that a prudent man would not have relied on 12 in. air pipes for the ventilation of a large seam, particularly when some small faults had just been crossed in the lower level, causing a larger issue of gas than in the ordinary way.

Mr. Sawyer, Assistant Inspector of Mines, stated that the 7 ft. Banbury was known to be the most fiery seam in the district. The certificated manager would not be justified in leaving the mine in charge of a contractor for a single hour, and ought to have been into it every day. Considering the ventilation of the mine it was impossible for it to have been free from gas for five days before the explosion, consequently the reports entered in the book were untrue.

It was further stated in evidence that the levels were in size quite inadequate for the ventilation of a fiery mine, and not driven in a workmanlike manner. The thirlings were blocked up with refuse, instead of being kept open for the free passage of air, these matters of course being all done with the knowledge of the manager.

George Burgess, a fireman, said he was in the pit up to 10-20 on the night before the explosion. He travelled the workings and examined them with a Davy lamp. He fired shots in all the working places the same night. In consequence of the breaking down of the air-pipes an accumulation of gas had taken place, but he found the place afterwards clear.

The writer admits there is much greater difficulty in ventilating fiery seams with an inclination so steep as the 7 ft. seam at Leycett Colliery as compared with seams lying almost flat, but this difficulty only suggests a more painstaking attention to every matter of detail, which it is evident was not a ruling principle in the management of this mine, where even extra precautionary measures were required. When the cause of a disaster has been found out, as we think it has in this case—firing shots in air currents contaminated with fire-damp

—surely the remedy is within the range of possibility; the remedy we have endeavoured to point out.

M. E.

## GOLD IN WALES—No. XXVIII.

SIR,—Some people are thinking that the working of gold in this country is only a notion of recent invention. It is not so in fact. It is quite true, however, that there is no strictly definite record of very remote searching for gold in Britain. There are those who doubt its very existence even now. Some folks seem to resist the conclusion that, inasmuch as it exists now, proves it also fact that it must have existed at periods of time very remote. The written evidences certainly go no further back than the time of the Romans in these islands, and it may be said—"That is not so very long ago." Truly, in a natural history sense, the incoming of the Romans is comparatively a very short time indeed. But what say numerous relics? Some have been found of a low Scythic or Tartaric caste of population, from Scandinavia possibly, or adjacent thereto. Iberians appear to have followed, comprising, it may have been the Phœnicians, Carthaginians, and Etrurians. In any case Dr. Hyde Clarke thinks the rivers were named by these Iberians, and not by the Celts.

It is also rather confidently supposed that traces of Iberian tenure are to be found in the Silures of South Wales. In short there appears surer ground for believing that the Iberians instituted the earliest commerce with the British Isles. The current belief has been that they came solely for tin; but I think the prime object of a hazardous expedition, besides the capture of fair girls for slaves, must have been that of obtaining a metal of which they knew the use and value, rather than one the use of which was scantily known, and which necessarily held no value at all. They very soon found out that gold was associated with tin in the tin streamings, which they first originated. Most probably, as Dr. Clarke puts it, the Iberians of Spain came to Britain on a gold finding or "nuggetting" expedition.

This notion is also fairly inferred from the fact of the Spaniards in more recent times going the round of American rivers on a similar errand. Obviously river washings were the ancient sources of the gold yield. It is certain that in the 16th century Spain sent out many expeditions with no other object than gold finding. It may, I think, be safely taken as fact that gold finding was the precursor of tin finding. Gold mining there was none, neither was there any tin mining at the time, or anything akin to it, as we now think of tin mining. It was all gold washing or tin streaming. It is not of any importance to try to find out the uses to which the gold when found was put. The one word "ornamentation," or perhaps "decoration," will hint out the disposition of a good deal of it. Roman opinion as to gold in Britain seems to have been anything but unanimous. It is not very likely that natives who knew of its whereabouts in natural deposit banks would readily tell it to those who enforced them into servitude, with undoubted "hard labour." Not a bit of it. They were truly conservative, and kept what they had gotten, and silence too as to whence it came.

Tacitus puts words into the mouth of Agricola which favour greatly the supposition that the precious metals constituted the first love of the Romans for the sea-girt isles:—"Fert Britannia aurum et argentum et alia metalla, pretium victorie."\* This is rather ambiguous. Pliny, however, knew of gold in Britain found in tin.†

It is quite certain that the Romans searched for gold at the Poltmore Mines, in Devonshire; the Gogofau Mines, in Carmarthenshire; at the Gold Scoop Mine, in Cumberland; and the Lanarkshire Hills. It is said that lead in Lanarkshire was found in seeking for gold. Antiquarians make it out pretty clearly that Queen Boadicea obtained most of her gold in Essex. Moses Stringer‡ wrote—"The mines of these parts were early known." It is also asserted that Cunobeline, Prince of the Trinobantes, coined at Cameldunum gold obtained from a mine in Essex.§

The Normans, it would seem, first set up a claim to gold and silver as royal peculiar property, and this, of course, checked effectually all private enterprise in that direction. In Edward I.'s time there is plenty of evidence that gold existed both in a free state and in combination with other minerals, as did silver, and a feeling of considerable excitement as to its acquisition appears to have existed for a century or more afterwards. But about Richard III.'s time those wonderful transmutationists, the alchemists, seized hold of people's expectations to an extent that priestcraft was altogether put upon its mettle. Priestly ignorance, and intolerance—that wretched devilry of ignorance—battled fiercely with the alchemist, and hurled the anathemas of the Church at their muddled heads until the Legislature, almost if not quite as muddle-headed, stepped in, and declared it felony to "multiply gold and silver."

By-and-bye some miners were invited from Bohemia, and lots of gold sets were mapped out, it is said, by the cutting up a bullock's skin into strips—tying them together, and one end of the length to a stake in the ground, making a circuit at full stretch with the other, and making the enclosed ground the mining sett. This may not be fact. I think it is not. All history is not fact.

The earliest actual record probably of gold mining is a writ directed to the Sheriff of Devon, requiring him not to allow of gold and copper mines to be occupied until the king shall give orders.¶ (47 Hen. III.)

There was a grant of mines of gold and silver in Devon 27 Edward I., and in the 29th year an ambiguous reference to the Mines Royal in Birland, in Devon, and a Commission of Enquiry as to Mines Royal in that county. In the 12th and 15th years of Edward II. there were grants to prospect for gold and silver in Devon. In 11 Edward III. Southrop was appointed Warden of the Mines of Gold and Silver in Cornwall and Devon.¶

Hollingshead, in his Chronicles, says that Edward III. in his 28th year leased his mines of gold and silver to John Hanner and Herman Kainsthorp, of Bohemia. In his 32nd year he granted to John Ballanter and Walter Balbolter all his mines of gold, silver, and copper in the county of Devon for two years.\*\* In the 37th year there was a grant of all mines of gold, silver, lead, and tin in the county of Gloucester to William Nottingham for seven years.†† Also, in the 37th year was a grant of mines of gold and silver in the counties of Devon and Somerset to William Nottingham, by indentures between him and the king. The grant is twice recorded.

Many other instances of gold licences, as we should now call them, might be cited; but these are sufficient for the purpose of showing a prevalent interest in the gold question in times gone by.

London, Aug. 11.

T. A. READWIN.

## UTILISING WASTE HEAT FROM METALLURGICAL PROCESSES.

SIR,—One of the most simple methods of utilising the heat contained in the waste of metallurgical processes is suggested by the invention of Mr. Wohlheim, of Vienna, and as it has not been patented in this country I do not doubt that it will be largely used. He suggests that air, gas, water, or other fluid be led in contact with such products, metals or materials, after these have left the furnace, so as to take up the heat therefrom, the slag, metal, or other product being caused to pass into closed receptacles or chambers, and the air, gas, or other fluid being either brought immediately in contact therewith inside the said receptacles or conducted through passages or flues surrounding or passing through the same. The supply of heated air or other gas thus produced is then utilised either for maintaining combustion in metallurgical or other furnaces, or for other purposes for which heated gases may be employed, and if water or other liquid be employed as the heat absorbing medium, such heated liquid may be used for heating or other purposes, or the steam or vapour engendered therefrom may be employed for working the steam or vapour engines employed on the works. Thus, by utilising the large quantities of heat that are ordinarily allowed to go to waste in smelting and other metallurgical works, a great saving may be effected in the fuel employed in carrying on the various processes at such works.

When it is desired to regain the said waste heat as completely as possible and to utilise it at once in obtaining a heated fluid of defi-

\* Tacit. Vit. Agric. † Plin. Hist. Nat., lib. 35, c. 16.  
‡ Opera Mineralia Explicata, p. 8. § Sir John Pettus' Fodina Regale, p. 32.  
¶ Ruding's Annals of the Coinage, vol. 1, p. 60.  
\*\* Cottonian MSS. Ortho., Ex. †† Cottonian MSS. Ortho., Ex.  
‡ Flouwen's Reports, p. 16.



nite temperature, this may be effected in various ways, such as by employing for heating a certain volume of the air or other fluid larger or smaller quantities of the heated products, or by mixing with products at a low temperature other products at a higher temperature before causing the fluid to pass in contact therewith, or separate supplies of fluid may be made to take up the heat from the different products, and these supplies at different temperatures be then brought together in larger reservoirs, so as in mingling to render the whole body more or less uniform before passing to the locality where the heat is to be utilised. Now, I admit that some of Mr. Wohlhelm's views may be visionary, but this account of his discovery certainly suggests to my mind that the slag and refuse might be used to heat the feed water for the boilers. The receptacle would be so constructed that the hot material could readily fall into the water, whilst the steam generated would rise into a dome above the water, and reverberate, if I may use the term, into the feed water.

Manchester, Aug. 10.

ECONOMY.

#### INDIAN GOLD MINES.

SIR.—At a meeting of the Glenrock Gold Mining Company Mr. Lonsdale stated that two boxes of quartz were sent home by the Poonah for analysis. Has the result been communicated to anyone; if so, where can one obtain information? SOUTH INDIAN.

#### THE GOLD RICHES OF VENEZUELA.

SIR.—In the article in last week's Journal on the Gold Riches of Venezuela reference is made to the average product of the Potosi Mining Company being 2ozs. per ton of quartz. Having in conjunction with friends in that country been developing these properties during the past ten years we are in a position to state that the average yield per ton has throughout the last six months been fully 3ozs. The subjoined particulars will, doubtless, interest your readers:—

	Total produce.	Net proceeds.
January .....Ozs.	1882-415	£ 7181 5 0
February .....	2127-120	8164 0 0
March .....	1709-066	6558 4 0
April .....	1809-090	6938 18 0
May .....	1907-976	7319 13 0
June .....	2350-484	9014 5 0

Old Broad-street, London, Aug. 12.

SOMES AND CO.

#### MINING IN CANADA—THE ACTON MINE.

SIR.—Like your correspondent, "One in the Dark," in the Journal of July 31, I also bought Canadian Copper shares when 20s. above their present price, and have often wondered why no reports had appeared in your columns or been issued to the shareholders. I observe, however, that Mr. Abbott, in his Circular of Aug. 6 (last week's Journal) says, "the advices received from this extensive Canadian property are decidedly favourable." Why, then, not furnish shareholders with a copy of them? and does not the withholding of "decidedly favourable advices" tend to depreciate the market value of the shares?—Aug. 12.

A SHAREHOLDER.

#### LEAD TRADE.

SIR.—Since writing to you about the sale of Greek lead, which was considered taken at a very high price, the following sales have been made:—340 tons (110 ozs. silver) Spanish lead, at 17s. per ton; 230 tons (68 ozs. silver) Spanish lead, at 16s. 17s. 6d.; 100 tons (40 ozs. silver) Spanish, at 16s. 15s. per ton. The market then looked rather weak, and some of the large smelters refused to buy at all, and the market stood in this way for some days, but to-day it is quite firm again, and the following lots sold:—230 tons rich Spanish, at 17s. per ton; 370 tons ditto, at 17s., which has cleared all the Spanish lead off the market that can arrive during the next few weeks, and this sale has made the Yorkshire smelters much firmer. During the last four or five weeks very large sales have been made, and I should think on the Tyne alone our smelters have bought quite 4000 tons, so that any demand for lead may see the market advance 1l. a ton, as the stocks in the producers' hands are very small.

LEAD ORE.—At the sale of Green Hurth, ore realised 20s. a ton more than on the last month's sales.—Aug. 12.

STOCKS.

#### MINING IN THE ST. AGNES DISTRICT.

SIR.—Has it occurred to you that a movement of considerable import is seemingly at hand in the St. Agnes district? It must be so in the nature of things. Those who read the reports and watch the progress of West Kitty know it well enough; and can your readers be aware that it is anticipated by first-class authorities that New Kitty (to the west, and immediately adjoining West Kitty and Wheel Kitty) is likely to be as productive as ever, and that 40,000l. have been in the past divided in profits by a former company? And is it known that Polberrow Consols is just being re-started by Messrs. Taylor? The present quotations are no guide as to the real value. It is in the interest of the public that mining facts and figures should be studied. It is hardly credible that Wheel Kitty shares should have been selling at 6d. each not long ago (now at 5l.), yet such is the fact. New Kittys are not at 6d., but the whole mine is selling under 6000l., and it is noteworthy that you can sell the shares as easily as you can sell Consols at the present moment.

Truro, Aug. 12.

WATCHER.

#### OUR MINERAL DEPOSITS—HOW TO FIND THEM—THE DOWSING ROD.

SIR.—Perhaps others, like myself, were slightly disappointed to find no mention in last week's Journal by some of your many correspondents relative to, pro or con, Mr. Williams's very interesting letter on the above subject, and prompts me to call attention to the matter. Everyone who has, or has had, any connection with Cornwall must read the statistical portion of the letter with regret, and no Cornishman can fail to sympathise with Mr. Williams, and hope his most sanguine expectation will be realised. Too, those geologic, and apparently necessary disturbances in the natural strata to afford a productive mine, are doubtless of vital importance, and the practical examples given are encouraging evidence to those who may be engaged in active search for mineral wealth. But I was surprised to find the dowsing rod so strongly recommended as a dependable instrument in prosecuting mineral research in Cornwall, and if in Cornwall its virtues are certainly as effective in other mining districts. If asked to define dowsing I should have called it the witchcraft of mining, and to be classed with other old faddles of Cornish mining superstitions—i.e., to take a light when climbing through the shaft between the steps of the ladder instead of around the side is, or at least used to be, deemed poor luck, and to whistle underground with some old miners was not to be tolerated for a moment. Still the practical examples given by Mr. Williams is so easy to repeat and verify it may induce some of your readers who have the opportunity to test it giving result. Cornwall, however, is not the only place the dowsing rod is believed in. For in conversation not long since with some gentlemen connected with mines in the North of England I was not a little surprised to learn that the agent of a large mine, and whose experience was held in good repute, had at a previous period called in the service of a diviner to determine if mineral was to be found in the direction in which he was then cross-cutting. No mineral was found, the dowsing was, therefore, at fault, but in justice to the agent let me say the direction of the cross-cut proved what would otherwise have been a problematic piece of ground. But an instrument to be serviceable must be amenable to the practice of any person after being properly instructed. A dowsing rod which requires one prong to be held in the hand of the adept, the other in that of the sceptical, cannot be expected to impart confidence to the public. Too, the distance at which the susceptible mineral is situated from the operator seem to have no value. "It is not frequent, though sometimes bodies of ore are only a few feet below the surface. But granted the dowsing rod possesses the properties claimed by Mr. Williams, there must be some rule governing this dipping propensity. In electrified and magnetised bodies this rule is practically well known, and the surveyor in passing over or near a body of ferruginous matter if magnetic the needle of his compass would readily indicate

its presence, proof of which is indisputable, but that influence becomes practically nil at a radial distance of a few feet only from the compass.

Of course the above remarks relative to magnetised bodies has, I presume, no connection with the dowsing rod; but perhaps Mr. Williams can give some approximate rule how ore bodies are found by its use; its action when the ore is near the surface, as in the example given by himself; what the greatest radial distance it is possible to detect the presence of mineral, especially when embedded in other rock; further, what the length of the forked prongs should be, and nature of the wood of which the dowsing rod is to be cut, for if it possesses any virtue the above conditions are elements to be considered, explanations of which will, perhaps interest others, as well as—

London, Aug. 11.

C. ROWE.

#### GWENNAP AS A COPPER-PRODUCING PARISH.

SIR.—Within the last half a century a great revolution has occurred in the mines of Cornwall as to their productions. Nearly all the copper producing mines have become tin mines—very little copper comparatively being raised in West Cornwall. Gwennap was the greatest copper district in the county; but most of its old mines are worked out, at least so far as to render them non-paying.

I will look at Gwennap as a copper producing parish so far back as 1827, when I went there to reside, and I subjoin a list of the mines and their products for that year, and also of the mines which yielded copper in the year 1879:—

Consolidated Mines	Sales	Tons	1847
Penstruthal	32	12,078	
Tresavean	8	1,565	
Wheal Damsel	12	1,708	
Tintang	16	2,757	
Poldice	6	3,288	
Wheal Maiden	12	2,632	
Carharrack	6	1,204	
Wheal Gorland	6	3,399	
Wheal Unity	5	980	
Wheal Unity Wood	3	47	
Wheal Beauchamp	7	613	
Treskerby	6	841	
Wheal Chance	6	640	
United Mines	6	1,357	
Wheal Spinster	5	213	

Total.....Tons 46,809

North Penstruthal	Sales	Tons	1879
Comfort and North Tresavean	3	30	
St. Aubyn United	1	48	
	1	15	

Total.....Tons 93

Looking at the above figures, showing such a striking contrast, some persons will, no doubt, say that "Gwennap is done as a mining parish." I do not concur with such an opinion. Some of the mines mentioned are, doubtless, unworthy of re-trial; but there are portions of the parish where copper lodes are known to exist where little or no exploration has been attempted, and where, I doubt not, mining will in future be executed on a large scale, although not, perhaps, as large as that of 1827. I will mention one such spot, viz. Trevine Consols, where six copper lodes of excellent promise have been discovered, and which are about to be developed under the management of Capt. J. Mayne, of St. Day, an agent of considerable experience in mining engineering. The lodes are parallel with those of Wheal Squire, adjoining, and with the rich lodes of Poldory and Ale and Cakes, and resemble in their composition the great lode at Tresavean, which yielded a profit of 450,000l. to the last company, and about 350,000l. to a previous company. I anticipate great results from those lodes when they have been opened a little deeper. One of the lodes is 8 ft. wide. At present the operations are shallow, but the indications are first-class for the depth attained. Soon after the engine has been set to work tribute ground will be set at once, and no doubt profit will be quickly made. If your readers wish to invest for early dividends here is a good subject for them.

North and South Penstruthal and Comfort Mines also hold out good prospects of success. I do not know East Buller so well as the rest of the mines, but I have heard a favourable account of it. I know that its position is good.

Although at the present time very little copper ore is being raised in the parish, it can be proved by statistics that it has yielded more profits from copper than those of any parish in the county. I subjoin a list of some of the profitable mines and the profits derived, according to the information which I have gleaned:—

Clifford Amalgamated (including Consolidated Mines, United Mines, and Wheal Clifford)	£1,250,000
Wheal Damsel	200,000
Old Wheal Jewell	300,000
New Wheal Jewell	300,000
West Damsel	50,000
Wheal Gorland	50,000
Wheal Unity	360,000
Wheal Unity Wood	100,000
Poldice (anciently) say	100,000
Tresavean (in all)	800,000
Wheal Beauchamp	100,000
Tintang	50,000
Penstruthal	120,000
Comfort	50,000
Trethellan	70,000
Brewer	70,000
Treskerby	50,000
Treskerby and Wheal Chance	300,000
Wheal Rose (Gwennap part)	50,000
Wheal Squire	100,000

Total.....£4,420,000

Admitting that the above may be an imperfect record of the dividends, I will challenge the total actually divided against that of any parish in Cornwall or Devon, even supposing that the profits in Dolcoath should amount to 2,000,000l., as I have been told. The Clifford Amalgamated Mines yielded more returns and profits than the celebrated Devon Great Consols; but not to one company—to three companies. I have a hope, strong and abiding, that the old parish will flourish again when I am off the stage of life, if not before. In the good providence of God I have survived all those who were active miners there in 1827, and I expect to live to see a rising tide of prosperity there again, and that not long hence. We have seen the lowest ebb, and the tide has turned. We shall soon witness better times.—Truro, Aug. 11.

R. SYMONS.

#### SHROPSHIRE MINING—THE ROMAN BOUNDARY MINE.

SIR.—The Stiperstones range of mountains have for many years been noted for their productiveness, in particular for lead ore and barytes. Still something seemed to be lacking, until Mr. H. Dennis took the management of the celebrated old mine, Snailbeach, when it was at once determined to meet the long-felt wants by making a branch of railway from Pontesbury to Snailbeach, for the purpose of transport of the different minerals used, and also for the convenience of the inhabitants at large. This branch is a great facility to the above mine, as lack of land carriage has been the obstacle to developing more mines in the district; and it seems only a beginning, for I feel convinced that ere long it will be carried on through the district, when good results can be anticipated therefrom, and as there are many sets yet in the locality unexplored, I may bring before your readers a few out of the many which professionals have written upon, and it only requires the mining capitalist to pay a visit to those mines now in operation and see the country and the different lodes traversing through the ranges of hills.

There is the Perkins Beach Mine, with five or six well defined lodes running through the sett, from which many hundreds of tons of lead ore have been raised and sold, and I have no hesitation in saying that thousands more will yet be raised when properly developed and

the mine placed in working order. Then, and not till then, will good results be found for the proprietors of the mine.

The tourist need not travel more than a mile farther, when he comes in contact with the Tankerville Mine, known as the "open pipe," which for the last 20 years or so has been one of the most profitable mines in the district, and which has prompted the shareholders to take up the adjoining mines—Pennerley and Bog; these latter connected with the Tankerville must open up a large and profitable mine, which will also improve the state of the country from the depression that has so long been felt by the working class. There are also several other places in the district, such as Mytton Dingle, east of Tankerville, and North Tankerville; and last, but not least in the eyes of many well versed in mining, is the Round Hill Mine. This mine is the basin of the whole of the mines, as can be seen by taking a retrospective view of the county map. I shall not be in the least surprised to hear of some speculator crossing the district and placing it once more in the list of dividend mines.

I shall now glance at the more western part of these valuable mountains, where there is in operation the East Roman Gravels, and from the report in your Journal of Capt. A. Waters every inducement to further develop and bring it to a prosperous and profitable mine. The Roman Gravels in itself needs no comment from my pen, as it stands so conspicuous in the mining world. Suffice it to say it is the richest, and likely to be the most endurable, mine in South Shropshire now in operation. Still, I cannot let this opportunity pass by without noticing that it must be considered a one-ended mine, as the engine-shaft is only some 30 fms. or so from the Boundary, and as the lodes in Roman Gravels and East Roman Gravels are chiefly north and south lodes, I consider that the Roman Boundary, upon another lordship's estate, would be equally as rich as the other, should it be placed in the hands of capitalists for their approval, as the whole of the lodes run into the Roman Boundary. In this sett there is every advantage for sinking a shaft and coming in contact with the whole of these lodes, and the ground is easy in its character and can be sunk without the aid of steam power to a depth of 50 fms. or so, while there would be no trouble with water. A small capital laid down would soon turn the Roman Boundary Mine into a parallel with its rich neighbour the Roman Gravels. These mines so prosperous should stimulate the promoters of the Snailbeach District Railway to carry on the once proposed plan, which would enhance the value of the different mines, and make the railway into a good paying concern.—Salop, Aug. 10.

OBSERVER.

#### THE MONA MINE.

SIR.—This really appears to have long been known as one of the richest mines in the kingdom, for I find upon reference to the valuable work on Metalliferous Deposits, published by Mr. W. Jory Wood, F.R.S., F.G.S., in 1871, some interesting remarks upon it. He states that "In Mona the enormous body of ore discovered near Amlwch, Anglesea, on March 2, 1768, lowered for some years the price of copper throughout Europe, and has been wrought without intermission until now. The great metalliferous deposit appears not only to have occupied the whole space between the Clay Shaft lode and the Black Rock lode for a considerable distance, but to have extended north of the one and south of the other. It has been wrought open to the day 90 fms. on line of its strike and more than 140 fms. in width in the hill-side open-cast, and 210 fms. on line of its strike and more than 90 fms. in width in the great open-cast. Depth, 18 fms.—an area of 5000 acres in former; and 23 fms.—an area of 12,000 acres in latter; and to a greater depth for short distances in both. Native copper, earthy black copper ore, vitreous copper, and purple ore have been obtained, the principal produce being copper pyrites. Great quantities were, of course, scattered throughout the earthy matrix. During three months of 1787 one party of workmen extracted 2941 tons of copper ore, and only 92 tons of waste. On one occasion 44,000 tons of ore lay ready for the furnace. The North Discovery lode (in Parys Mountain) is worked to a depth of 112 fms. To a depth of 18 fms. in one part, and 23 fms. in another, the great metalliferous mass was quarried for its entire depth."

I am also informed by the most reliable authority that the North Discovery lode stands whole in the Mona Mine; it gave 500,000l. profit in Parys; all these riches have yet to come in Mona, a most valuable and important point. At the Mona Mine, 1832 to 1862, the amount of copper ores calcined were 155,404 tons. From 1861 to 1867 they prepared for sale 17,833 tons of ochre, besides immense quantities which escaped into the sea. I am further informed that Mona has given 7,000,000l. in profits during the 112 years working. The mine requires only to be visited to ascertain the facts of these statements.

AN INVESTOR.

#### DEVON COPPER AND BLENDE COMPANY.

SIR.—In looking over the Journals for the last few years I find the enclosed extracts and extraordinary facts with regard to this company's mine, which is now being so splendidly worked, and with all the first-class new modern machinery on the ground. I said in my letter to you in April last that the shares of this company would go to 100 per cent. premium, and so they have, for I have a buyer of 5000 at 125 per cent. premium to-day. As sure as I am writing this letter—and I know what I am writing, as I have been over every part of the property with engineers—when Capt. Skewis has driven the adit up from the brook, which will give 50 fms. backs, and cuts the great gossan lode the late Capt. James Richards loved so to talk about, and which is so well known to all miners in the neighbourhood, the shares will go to 1l. each. The lode, as everyone knows, is the same as the Great Wheal Friendship, but at Wheal Friendship they never had such enormous rocks of gossan on the surface as here. I saw one block myself, used as a gate-post in the fence close to the mine, 6 ft. high, and about 5 ft. square; and the stones in the old house, Collacombe Court, are partly gossan. Lastly, I must say that the shares being only 1s. has caused a great deal of gambling amongst the men (this I regret), and, of course, will be more so as the water is being pumped out and the adit nears the great gossan lode.

August 11.

A LATE MINE MANAGER.

#### EXTRACTS FROM MINING JOURNAL.

July 7, 1855.—At the 50 fm. level the lode in Collacombe is worth 70l. a fathom for copper ore.  
April 12, 1856.—Sold this quarter 2173l. 5s. ore; 1l. shares 60l. each.  
March 25, 1857.—Declared dividend 1l. a share, and 1535l. 18s. 9d. balance left in bank.  
July 30, 1858.—Dividend 1l. declared. Mr. W. A. Thomas in chair of Devon Consols. Balance forward, 1347l. 2s. 1d. Shares made 2000 instead of 1000.  
Oct., 1859.—A dividend 7s. per share declared, and 1095l. 7s. 10d. forward.  
Jan., 1859.—Copper ore sold (1560 tons) realised 10,340l. 5s. 4d. Dividend declared 4500l., or 2l. 2s. per share. The samplings in future will be every two months. Roasted to-day a fine ox. Great rejoicings at mine.  
Dec., 1855.—Sold 7915 tons of ore for 5l. 12s. 4d. per ton=44,442l. 2s. Boiler burst; mine filled with water.

#### MINING IN CARDIGANSHIRE

SIR.—To write is naturally to have something to write about, and having read the able letter in last week's Journal signed "Actual Facts," I simply am desirous of adding my quota to the remarks made therein, since if I were to attempt to do so about all the mines in the above county I feel that I should signally fail, nor could I be so pedantic as to assert what has not come under my own knowledge, or to gauge the value or merits of such properties; so acting in the best spirit, and wishing increased prosperity to all sound concerns, I, in my individual capacity, can only call the attention of investors to those undertakings of which I can speak with all good faith as to their stability and sterling worth.

Mining is, as we are all aware, called an adventure, and naturally it comes into the same groove as all pursuits until it has been made successful. The pioneers of every great enterprise have been simply adventurers, and greatness never came from greatness, but from small beginnings. If fortune smiled on all there would be no room for energy, nor for the expansion of genius. Your correspondent cites amongst others the Bwlch United Mines. These mines undoubtedly deserve the attention of capitalists for many reasons, not the least being their productive state, which has been brought about by a small expenditure of the present company's means, full advantage having been taken to utilise the former large outlay. The ground is now rapidly being laid open for permanent dividends, whilst the reserve of capital is ample for all eventualities. Investors



have, therefore, very little risk to run and all to gain. The mine is now well found in splendid machinery for all purposes, and the which is on the highway of prosperity, and its coach will be driven by its own merits. The West Lisburne Mines should not be lost by those who wish to make money on a small outlay. I am acquainted with the locality, and there are numerous progressive mines now attaining a profitable position in the neighbourhood, and it is idle for any writer, like "Nemo" on the 24th ult., to condemn wholesale partially wrought ground to the east and west of our great mines, as by development who can say but that equally profitable results will be the case. The West Lisburne is a most promising concern—there is plenty of ore on surface, with fine lodes up to 10 ft. wide, mineralised, and proved to the 46 fm. level. The property is in the position that a large extent of ore ground can be once profitably stoped out. There is no cash to pay for the mine, nor any promotion money.

Little doubt is expressed that ere long we shall have a reaction to share purchasing in lead mining. I, therefore, strongly recommend those interested in this company to only issue the small number of shares actually required, and rapidly bring this undertaking to a dividend state, and, as pioneers in a legitimate venture, wait for that success which is sure to attend their efforts, since it is rare that a property is offered to the public under such legitimate conditions.—London, Aug. 9.

SHAREHOLDER.

## CARDIGANSHIRE MINES.

SIR.—Immediately to the west of the Dolfawr ground, which it will be remembered was proved to be exceedingly rich by Sir Thos. Bonnell and others, we come to the Cwm Pryf Mine, which contains several lodes running parallel to each other; one of these is undoubtedly the old Gelhi lode, but the Cwm Pryf adit level is commenced too far to the north to cut this latter lode. The lode they are now working on has been, however, proved to be highly productive, even the waste heap of the old miners being valued at 7000l. The engine-shaft has been sunk 30 fms. below the deep adit, and the long courses of ore already discovered have proved longer and richer at every successive level, therefore there is every encouragement to continue the extension and sinking of this valuable property. Could an arrangement be made for acquiring the adjoining mine—Dolfawr—the deep cross-cut of that mine, which has not yet cut the Gelhi lode, would, by being pushed on, not only cut this latter lode but also all the Cwm Pryf lodes in succession, and that at a depth of many fathoms below the present Cwm Pryf deep level. There can be no doubt whatever that with the amount of additional capital which I see they now propose to raise—25000l.—this mine will soon enter the Dividend List. This is the last mine in the Rheidol Valley which is now being worked, except two men working at the Old Rhw Rhugus Mine.

Tan-y-rallt Mine has sold 12 tons of ore last week to Neville, Druce, and Co. The new discovery continues to improve as the level is extended, and we are now approaching the junction with the well-known Penybanc lode. Her Majesty's new Inspector of Metalliferous Mines (Dr. Le Neve Foster) visited the mine this week, and was so struck with the solidity and productiveness of the ore that he forwarded samples to the Mining Museums of Truro and Penzance. In sinking below the 22 the course of ore is very much improved, the lode becoming wider and stronger, and the rib of ore is now about 10 in. to 1 ft. wide of pure steel grained ore. A new engine-shaft is about to be sunk to come down close to the courses of ore in the 12 and 22 fm. levels, and a large water-wheel erected to crush and pump the mine. I shall probably finish the description of the North Cardiganshire district in my next letter.

Dol, Talierin, Aug. 11. CHARLES WILLIAMS, M.E.

[For remainder of Original Correspondence see this day's Journal.]

## FOREIGN MINING AND METALLURGY.

The condition of the Belgian coal markets continues favourable. Undeniable symptoms of a revival in business have appeared, and it is expected that prices will advance from week to week. The demand continues considerable, and coalowners show a disinclination to enter into long-term contracts. There is probably scarcely a single colliery proprietor in the Liège group who would now sign a contract binding himself to supply coal at present rates for a term of six months. In the first half of this year Belgium exported 2,137,612 tons of coal, against 2,062,487 tons in the first half of 1879. Belgium also exported 395,708 tons of coke in the first half of this year, as compared with 296,641 tons in the corresponding period of 1879. It appears that the consumption of coal in Paris for the last ten years has averaged 772,621 tons per annum; in 1873 the consumption exceeded 1,000,000 tons; in 1871 it had declined to 550,000 tons. The French coal trade has remained generally in much about the same state. The Austrian coal trade has continued quiet, but an advance is expected to take place when the sugar manufacturing season commences, and the German coal trade continues to present a favourable aspect.

The situation has continued to improve in the Belgian iron trade. Iron has been in considerable demand, and the same may be said of plates. Orders have come to hand from almost all sides, and have imparted to quotations a firmness for which we looked in vain a few months since. A quotation of 7l. 4s. per ton appears to be the minimum rate at which business can now be done in plates. Pig of the first quality cannot be obtained below 2l. 8s. per ton, although secondary qualities might be purchased at 2l. 4s. per ton, and even at 2l. per ton. In connection with the construction of 40 locomotives for the Belgian State Railways, it is stated that tenders submitted by several firms have now been approved. The Minister of Public Works proposes to apply for a further credit for 50 locomotives and 1000 trucks. This announcement has given much satisfaction to all associated with the Belgian iron and coal trades. It appears that in the first half of this year Belgium exported 19,475 tons of steel, 7180 tons of pig, and 117,907 tons of iron. The John Cockerill Company has submitted the lowest tender (16,625l.) for the construction of a gasometer (to contain 22,000 cubic metres of gas) for the City of Brussels. The next lowest tender was that of MM. Nicaise and Deleuve.

In the French department of the Haute-Marne transactions in iron have become fewer, if anything; there was a slight revival of orders recently, but it was not of very long duration. Upon the whole, purchasers have shown reserve, and the market has been characterised by indecision. Rumours of a decline in quotations in the Nord have caused prices to show some little weakness in the Haute-Marne. Rolled iron from coke-made pig is maintained nominally at 8l. 8s. per ton, but it is parted with nevertheless at 8l. 4s. per ton, and in the case of important transactions at 8l. per ton. Mixed iron has been quoted in proportion at 8l. 16s. to 9l. 4s. per ton, and iron from charcoal-made pig at 9l. 16s. to 10l. per ton. Rough casting-pig has reflected the recent advance in England and Scotland. No. 3 has sold readily at 3l. 8s. to 3l. 12s. per ton at the works. The foundries have a good number of orders on hand, and are busily at work. The Fives-Lille Company has just re-opened its works; the working day has been fixed at 10 hours. The German iron trade has experienced little change. An adjudication for 400 tons of steel rails has just taken place at Wiesbaden; the lowest tender delivered was 9l. 10s. per ton. These were the terms offered by the Rhine Steelworks Company, Ruhrort.

The German papers contain some additional particulars respecting the conference between the railway authorities and the Silesian and Westphalian coalowners, which, as already announced, is to be held this week, in order to discuss measures for enabling German coal to compete more effectually with the English mineral. It is complained that, notwithstanding the efforts hitherto made, English coal has not only still a dominant position in the North Sea and Baltic ports, owing to the cheapness of water carriage in comparison with transport by rail, but that it finds its way in considerable quantities to the inland markets. Berlin and the neighbouring industrial districts consume large quantities, the trade in the foreign fuel being favoured as far as these places are concerned by the rivers and canals. Last year, for instance, Berlin imported 92,077 tons of English stone coal,

English coal in the neighbouring manufacturing centres is still greater, and it is estimated that the total consumption of English coal in Berlin and the surrounding country is not less than 300,000 tons per annum. The conference is to be held under the auspices of the Prussian Minister of Public Works, and an important point for discussion will, of course, be the possibility of reducing the cost of railway carriage for coal to the level of that of water carriage.

According to mail advices from Melbourne (June 24) there had been an important discovery of gold in the Talbot district, which was likely to open up about four miles of one of the richest alluvial deposits in the colony. Gold-mining affairs continued brisk in the Ballarat district, where additional discoveries were also reported. The returns from the other gold-fields of the colony showed that the yield was keeping well up to the average. The labour market continued in an unsatisfactory condition.

## SAPPHIRE MINES OF SIAM.

The commercial report by the acting British Consul-General in Siam for the year 1879 contains the following information upon the sapphire mines:—

The year 1879 will long be memorable in the provinces of Battambang and Chantaboon for the discovery of valuable sapphire mines and for the great influx of foreigners, chiefly from British and Independent Burmah, to work them. There have long been mines of inferior value in this neighbourhood, and about five years ago new mines were discovered by a native hunter. Being, however, in a very remote and secluded position it was some time before the fame of the new mines spread to the Burmah and Indian gem traders and miners. Some individual diggers, however, having found their way to the mines, and having returned to Rangoon and Calcutta with the proceeds of their work, realised very large sums, and a rush for the new mines commenced and continued throughout the last year, during which many thousands of British subjects passed through Bangkok from British Burmah on their way to the mines. The arrival of these large bands of armed strangers caused considerable alarm among the natives of Chantaboon and Battambang, who could scarcely be persuaded that the country was not invaded once more by the old hereditary enemies of Siam, the Burmans and Peguans. The miners, however, by their peaceable behaviour, restored confidence, and the country people soon were glad to sell them all kinds of provisions at enhanced rates.

The miners, in their haste to become rich, disregarded all considerations of health, and immense numbers died from jungle fever. The T'oung-thoos from Pegu proved the most capable of standing the climate, and many having made money and returned successful to their homes, the rush continued unabated for a long time; but now the great mortality is beginning to tell, and the broken health and emaciated appearance of most of those who return will check the eagerness of others to try their fortunes in this fever-stricken district.

The governor of the province has hitherto levied 2½ ticals (5s. 7½d.) from every man working at the mines, and this is cheerfully paid. Good order has hitherto been maintained, and the governor has appointed a British subject, named Kam Sai, to act as headman and to collect the license duty.

The Siamese authorities do not regard with entire complacency this conveyance from their soil of these valuable gems without payment of royalty. No definite proposition has, however, yet been made to impose any other than the licence tax above mentioned. There would probably be found considerable difficulty in collecting any sort of *ad valorem* duty. As it is, the discovery of the most valuable stones is kept as secret as possible by the fortunate finders, and should any *ad valorem* duty be attempted to be imposed the tax-gatherer would probably be defeated by craft or force.

One of the miners who was in Bangkok on his return from the diggings, a poorly-clad and miserable looking individual, on being applied to produced a few small stones, and, after a good deal of coaxing, was induced, with many precautions, to give us a private view of his great prize, which was a very large sapphire in the rough, which he valued at 20,000 rupees. He would probably not have shown this stone at all had he not been on the point of leaving in a steamer. Owing to the secrecy thus observed by the possessors of valuable gems, it is impossible to give any estimate of the total value of stones found, but that individuals have made very large profits is certain. There is a man now in Bangkok who dug out a stone which he offered for sale in Chantaboon at 1000 rupees, but did not find a purchaser. He went with it to Rangoon, where he was offered 15,000 rupees; but, having then awoken to the value of the stone, he declined to sell and took it to Calcutta, where he eventually obtained 30,000 rupees for it. Now, however, there are many experienced gem merchants established in the neighbourhood of the mines, and something like the real value of the stones can be obtained by the miners on the spot.

Many of the miners finding themselves in cash have invested in the luxury of wives taken from the Siamese population, and the value of marriageable young women, who are at all good looking, has in consequence gone up to a very high figure.

The largest sapphire hitherto found, which I know of, weighed 370 carats in the rough, and when cut turned out 111 carats of the finest water. The ruby, onyx, and jade are also found in the district, but the quality of none of these is such as to make them very valuable.

## NOVEL EXPERIMENT AT WALSALL.

An experiment of interest and importance took place on Monday, at the Birchills Hall Ironworks, Walsall. It will be remembered that in May last a terrible boiler explosion occurred at these works, resulting in the death of the furnace manager and a number of the workpeople. The boiler which exploded was a four-furnace vertical Rastrick boiler, of which there were at that time three in use on the works. The very full and careful reports presented at the enquiry by gentlemen representing the Board of Trade (Mr. T. W. Traill, chief-engineer and surveyor, and his colleague, Mr. T. D. Richards) were such that the directors of the company determined to discontinue the use of the remaining two Rastrick boilers, and accordingly one was cut up into plates, and the other was handed over to the Board of Trade officials for the purpose of the experiment which took place on Monday. As the latter boiler is a counterpart of the one that exploded in May it was resolved to burst it, with a view of ascertaining its weakest part, and of throwing, if possible, some kind of light on the explosion of the other, and on the maximum strength of that kind of boiler generally. Accordingly preliminary arrangements were made by Mr. Jonah Davies, and the experiment was carried out under the superintendence of Mr. T. D. Richards, and in the presence of a number of gentlemen, including Mr. E. B. Marten, C.E., and Messrs. Thompson (representatives of the Manchester Steam-Users' Association), N. McDougall (chief engineer to the Boiler Insurance Company, Manchester), R. B. Longridge, jun. (Manchester), Herbert Bewlay (Messrs. Piggott and Co., Birmingham), R. C. Braithwaite (Wolverhampton), S. L. Millington (Summer Hill Ironworks, Tipton), Stephen Watkins (Wolverhampton), Henry Burch and Charles Burch (Staffordshire Ironworks, Walsall), J. B. Davies, George Thomas (Mayor of Walsall), Alderman Williams, R. W. Brownhill, William Brownhill (Chairman of the company), Josh. Brownhill (secretary to the company), and several representatives of boiler companies. The boiler, prior to being burst, was removed from its old position—a short distance from the spot occupied by the one that exploded—and was placed in a vertical position on an open space immediately outside the works. The boiler, which was made in 1865, is 30 ft. in length, and 10 ft. 1½ in. in diameter; the internal flue 4 ft., and the four furnace necks 2 ft. in diameter. The pressure employed for the bursting was, of course, not steam, but hydraulic, and, consequently, there was little or no risk attending the experiment. One of Tangye's steam-engines and a powerful ram-pump were brought into requisition, and the boiler was filled with water. Later on a little leakage was observed, and the pressure was temporarily withdrawn to enable the leakage to be attended to. On the pressure being again applied and considerably increased the boiler failed just under the man-hole, a fracture being made in a thin plate, around which there was no strengthening ring. It was thought that, so far, the experiment was useful, the weak part of the boiler having

and only 75,877 tons of Westphalian coal. The consumption of been discovered. Some doubt, however, appeared to exist as to the precise pressure at which the failure took place. It was generally agreed to be about 90 lb. to the square inch, or three times the ordinary working pressure. It is intended, however, to repair the fracture, and to continue the experiment at an early date. On the invitation of the Chairman of the company the gentlemen present adjourned to the offices, where refreshments were provided.—Mr. Marten moved a vote of thanks to the company, which was seconded by Mr. Richards, who spoke in commendatory terms of the public spirit the company had displayed, remarking that it was not often that steam-users were willing to allow such experiments. He thanked the company on behalf of the Board of Trade, and added that no doubt very valuable data would be obtained before the experiments were concluded. Mr. William Brownhill acknowledged the compliment, and said that one object the company had in view had already been accomplished. The weakest place in the boiler had been discovered, and he thought that after that day's experiment there ought to be no man-hole in such a boiler without having a strengthening ring round it. The company in this matter had but one object in view, and that was the preservation of human life.—The proceedings then terminated. It may be added that the Rastrick boilers have been replaced on the works by cylindrical boilers with hemispherical ends 33 ft. long, and 6 ft. in diameter, and combining a number of important improvements.—Birmingham Daily Post.

## REPORT FROM CORNWALL.

Aug. 12.—August is justifying its reputation in mining matters as one of the dull months of the year, for although business is on the whole fairly holding its own, there is no immediate likelihood of any important change. As usual, when the condition of the metal market is uncertain, and opinions are divided as to its prospects, there is very little disposition on the part of holders of any other than very speculative shares to sell, or on the part of would-be-investors to buy. Established mines are well worth their current price, and this fact appears to be generally recognised. The very smallest turn of the scale in the London markets may, however, effect such an inducement either way as to give rise on the spur of the moment to a large amount of business, and we cannot help adhering to the opinion we have steadfastly held, in spite of fluctuations, that that turn cannot be far distant. Then comes a time when all efforts to upset or thwart the operation of the ordinary laws of business relations must fail, and the plain straightforward conditions of commerce rule. But these are days in which investors must be prepared to look ahead and draw their own conclusions. The least reliable of all data just now in regard to tin mining is the course of the standards, which nearly always follows, and rarely by the merest chance leads. Nor is the apparent course of the metal market, if taken at isolated intervals, much less deceptive. Faith and confidence are the two best qualities which holders of shares can possess under these conditions, and there is plenty of room for the profitable investment of additional capital where this confidence in the future of Western mining exists, if only the ordinary precautions against illegitimate and ill-founded speculation are taken.

We hear of the probable revival of mining in several localities in addition to those which from time to time have been mentioned; and there is no doubt that, especially as regards copper mining, a moderate advance in prices would largely stimulate enterprise. It is quite certain that there are many productive copper mines in shallow ground which a little energy would readily open up, and not improbably revive to some extent the days when such enormous quantities of copper ore were returned from such comparatively shallow workings and at such a moderate cost. There are not wanting indications of a probable rapid development in this direction in the Tavistock and Gunnislake district, which may recall if they do not rival the most famous days of Wheal Maria. The more the matter is examined into the more one is astonished to find the wide area there is of practically unworked ground, or of ground that has only just been opened upon, where the workings of the "old men" give every prospect of most profitable results.

How far it is wise to introduce the "divining" or "dowsing" rod into this aspect of mining affairs is to us more than doubtful. It is quite possible to hold that lodes are channels of electric currents or the like without believing that these currents of necessity make themselves felt by a piece of stick. There are far better and far older indications of metallic wealth than "dowsing," even when we give its advocates credit for all they claim; and its introduction at the present juncture as a valuable element in mining progress must seem to the general public to savour somewhat of easy faith, if not perchance of charlatanism and quackery, though we know that in many quarters its virtues are strictly believed in. We, however, have never known a case in which "dowsing" could without controversy be said to be successful, though instances of its failure are legion. It is not the way in which the oldest of our "old men" went to work, though there is a current belief that dowsing in this locality is of very high antiquity. There is very little doubt that we owe its introduction here to the German miners, to whom, in the days of Elizabeth, we were indebted for so many genuine improvements.

A new pulveriser, patented by Mr. F. W. Michell and Mr. Tregoning, has been erected at Wheal Pevor, which is spoken very highly of. One machine disposes of 8 tons of burnt leavings in 24 hours at a small cost, reducing all the stuff sufficiently fine at the first operation—a very great advantage and desideratum.

The Miners' Association had a very profitable and enjoyable trip on Tuesday to Wheal Eliza, where, to the number of nearly 200, they were welcomed and hospitably entertained by Mr. Barker, the principal shareholder, and Captain Williams, under whose direction Wheal Eliza has become in the fullest sense a model concern. Nowhere in the county has there been a more thorough determination, by the aid of economical working, to produce the best results, and nowhere has the proportion of hand labour in dressing operations been reduced to such a minimum. Nowhere, too, has there been a better understanding and a more cordial co-operation between adventurers and manager. The Chairman claimed that everything had been done that was calculated to save manual labour and improve the position of the working miner, and abundant evidence was afforded during the visit that this was no mere idle phrase or empty boast. Capt. Williams, in the course of his remarks, summarised in excellent fashion the work which had been done, in which he said they might almost see the practical outcome in detail of the teachings of their own Association. In that mine they had studied detail very much. They had begun at the beginning. They had studied every detail underground as well as at surface. There was a great deal to be considered as to the explosives in use. Their mine was worked nearly entirely under the land of a manor upon which they could have no sort of shaft, and the air had, consequently, to be sent ¾ mile through the various workings; but they had been enabled to accomplish that in such a way that Dr. Foster, the late Inspector, gave it as his opinion that Wheal Eliza was one of the best ventilated mines in the county. The next thing they attended to was the transit of their stuff underground. The old iron wagons were cumbersome heavy things, and so they made them of fine and thin steel, and they had wagons now of 502 lbs. of the same capacity as the old wagons of 10½ cwt. They had also excellent roads underground, and the cost of transit for over ½ mile was only 6d. a ton. They had studied economy in winding and protecting their steam pipes. Taking a mean average they drew 55 tons 600 ft. with ½ ton of coal, and the drawing cost, including coals, candles, and engineers, on an average for 600 ft., was 3½d. per ton. The cost of putting the stone through the crusher was one-eighth of a penny per ton; for working the incline to the stamps, five-eighths of a penny; and the man who manipulated the crusher cost 3d. a ton, so that the whole treatment of the ore from the time it came to surface to the time it went to the stamps cost 1½d. a ton. Then their stone-breaking made the stamping much more economical. The stuff was already broken so much finer that they stamped 15 or 20 per cent. more stuff under the same number of heads in the same time. Their buddles also were of a most efficient description. The average cost of returning a ton of ore to the smelting works during the last six months was 18s. The result of all this was that on Wednesday last, when they held their half-yearly meet-



ing, they divided 8192*l.* as dividend, and made a profit of 9000*l.* for the half-year.

With all these facts in actual operation, clearly the visit of the Miners' Association to Wheal Eliza cannot fail to result largely in good. Other things being equal, what has been effected on one mine can be done elsewhere, and conditions do not always differ so much as is assumed.

#### REPORT FROM NORTH AND SOUTH STAFFORDSHIRE.

Aug. 12.—There is no diminution in the amount of business doing at the mills and forges this week, and prices all round are somewhat firmer. The list houses still demand 8*l.* for marked bars, and only one or two firms quote under this figure. Makers of galvanised sheets are well employed, and for sheets of 24 w.g. in bundles, delivered in London, the quotations vary from 14*l.* 10*s.* to 16*l.* 10*s.*, according to quality. The producers of block thin sheets are doing a good business on export account, Australia and Russia being the most conspicuous consumers. Full employment is being found for the men in both the ordinary sheet and hoop iron departments, and for the latter from 6*l.* 15*s.* to 7*l.* 5*s.* is the quotation. Boiler-plates are in somewhat improved request, but prices are unaltered. The stocks of native pigs at makers' furnaces keep large, and it cannot be reported that the deliveries going away show any great improvement. Consumers who have bought forward at the old rates are disinclined to purchase with much spirit in the face of the stronger attitude of the market—2*l.* 10*s.* is the price for Derbyshire pigs. Best native pigs are quoted at 3*l.* 10*s.* to 4*l.* for hot-blast sorts, and Lancashire and Welsh hematites are firm at 4*l.* For South Yorkshire pigs 3*l.* is asked, but seldom realised.

The operative tin-plate makers in South Staffordshire and East Worcestershire, who have been out on strike for some time against a reduction in their wages of 7½ per cent., have at some of the principal works been allowed to commence at the old rate of wages, and it is expected that the other employers will now give way.

The petition for the exemption of the mines in the Tipton district from the operations of the Mines Drainage Acts has now been presented to the Commissioners. The petition, it is believed, is signed by the statutory number, and is stated by the promoters to represent an assessment to the poor rates of about 15,000*l.*, half of which stands opposite the name of the Earl of Dudley. The Commissioners have issued a circular urging the petitioners to withdraw their signatures in view of the serious disaster which threatens the district should the pumps of the Commissioners be allowed to stand. At the monthly meeting of the Commissioners in Wolverhampton to-morrow it will be moved that a general drainage rate for the half-year ending June 30, 1880, be assessed and levied upon all occupiers of mines within the drainage area after the rate of one penny upon every ton of slack shale, limestone, ironstone, fire-clay, coal, or other minerals raised. The rate will be payable on October 1.

The Patent Nut and Bolt Company (Limited), of the London Works, near Birmingham, have, we understand, purchased from the liquidator the name, goodwill, patent rights, leasehold and freehold land and works, the plant, machinery, and stock belonging to the Birmingham Bolt and Nut Company (Limited), Soho Works, near Birmingham, which company was incorporated in the year 1876 for the purpose of developing the business previously carried on by the firm of Howl and Salter, on the same premises.

#### THE TRADE OF THE TYNE AND WEAR.

Aug. 11.—The Coal and Coke Trades are very quiet, and terms are easy. Gas coal is in good request at late rates, and it is fully expected that if the iron trade keeps the position it has now attained and improves a favourable effect will be produced on the autumn coal trade. We have often noticed the great improvements made on the River Tyne during the past few years—that is, in the depth of the channel, the removal of points, such as Bell Point, &c., and the formation of piers and docks. A few days ago the Sapphire, a sailing vessel, went direct to the Grain Company's wharf, Newcastle Quay, drawing 23 ft. of water, and delivered afloat a cargo of over 8000 quarters of grain from America. The facilities now provided for shipping cannot fail to have a beneficial effect upon the commerce of the port. The Iron Trade continues stronger, and metals are improving in value. A firm tone has prevailed in the Cleveland iron trade, business having been done at 44*s.* 6*d.* for No. 3. This is a slight advance; the favourable returns of the Cleveland Ironmasters Association has had a good effect. Exports have been dull on the Tees this week. There have been extensive imports of iron ore from Bilbao, chiefly for use at the Eston Steelworks. The iron-founders meet with increased enquiries. The finished iron-trade continues satisfactory. There is a great demand for ship-plates, rates improving for plates and most other kinds of finished iron.

The monthly return of the Cleveland iron trade shows that during the month there have been 112 furnaces blowing, an advance of two on last month, and of 23 on July last year. There are 165 furnaces in the district, and nearly completed several others at the Consett Ironworks, Sir Wm. Armstrong's, at Elswick, &c. The make of Cleveland pig for the last month reached 163,254 tons, an increase of 1545 tons as compared with June last. The make of other kinds of iron hematite, &c., 49,354 tons, an increase of 5100 tons on the June make. The shipments (foreign) from the port of Middlesbrough have been 44,789 tons, as compared with 43,745 tons in June last. The coastwise shipments have been 37,517 tons in the month. The makers' stocks have decreased by 3557 tons, and the stocks in warrants stores have increased 7623 tons. There is a net increase in stocks and stores of 3454 tons—about half the increased make. These figures are satisfactory, and they prove that the iron trade is steadily reviving.

The award of Sir R. A. Cross in the case of the Durham mechanics claims for a return of what is known as the nine-hours system of working, which is 54 hours per week, has been given. This dispute has been pending some time, and the question was referred on the part of the owners to Mr. S. B. Coxon and Mr. Douglass, and on the part of the mechanics to Mr. W. Crauford and Mr. G. Dover, but as these gentlemen could not agree, the question was ultimately referred to Sir R. A. Cross, and he states that while deprecating the strong language in which the claim of the mechanics had been made he awards that the men should revert to the working time of 54 hours per week, that is known as the nine-hours system, and that no alteration in wages rate should be made in consequence.

NORTHERN INSTITUTE OF MINING AND MECHANICAL ENGINEERS.—The annual meeting of members was held on Saturday in the Wood Memorial Hall, the President, Mr. G. C. Greenwell, in the chair. The report of the council, read by Mr. Theo. Wood Bunning, the secretary, stated that the receipts for the year had been 323*l.* 16*s.* 3*d.* above the expenditure. The council earnestly appealed to all who had the welfare of the Institute at heart to endeavour by every means in their power to extend its influence by introducing new members, and by assisting in the work it was established to perform. It also pointed out that all connected with mining operations should carefully weigh and consider all the circumstances attending every cause of danger in the working of minerals, and to endeavour if possible to lessen their fatal effects. That accidents are in many cases inevitable is too true, but that much can be done to lessen their number and reduce the number of fatal accidents is not to be doubted. The chief cause of the loss of life in coal mines was the presence of gas, and Mr. Lindsay Wood had conducted an extensive series of experiments at the Boldon and other collieries, in order to ascertain the conditions under which this gas is occluded, and the pressure also attained. The results of these experiments have been published and given to the members, and it is expected that from the contents have been studied they would pave the way to more effective means of keeping the working clear. The council had the pleasure to report that the members of the Institute of Mechanical Engineers would visit Newcastle next summer, and a committee had been formed to assist in their reception, and to consider the desirability of inviting the mining engineers of the North of France, South Wales, and Yorkshire to visit Newcastle on the occasion. The secretary read a paper by Mr. Henry Hall, Inspector of Mines for Lancashire, on "Rapid Sinking;" and Mr. D. P. Morison

exhibited a new form of steam indicator called "Kenyon's Pistonless Indicator," which he said was much more sensitive than Richards'. The Institute was formed for the purpose of preventing accidents in coal mines, and this object has never been lost sight of by the members. The paper on the pressure of the explosive gas occluded in mines will, no doubt, afford the means of making calculations to show the total quantity of this gas given out in a given time in any given mine, and thus some data may be arrived at which may be useful for facilitating determinations as to the ventilating power required to prevent accumulations of gas. The researches of the members and the papers written by them, with the discussions thereat, all have the object of reducing coal mining as much as possible to a science, and this must have a direct tendency to ensure safe and economical working. At the same time mining engineers ought not to lose sight of the fact that each mine has peculiar features which require close study and particular treatment, apart from any general laws or rules which may be laid down or deduced from practice and experiment.

INSTITUTION OF MECHANICAL ENGINEERS.—At the meeting of this Institute at Barrow this week an able and interesting paper was read by Mr. David Joy, of the Barrow Shipbuilding Company, on his patent reversing and expansion valve-gear. An important discussion followed the reading of the paper, in the course of which the patent valve motion of Mr. Marshall, of Hawthorn and Co., Newcastle, was brought before the meeting. The object aimed at in both inventions is to get rid of the defects of the link motion in general use, with its great wear and tear, which has become excessive in the large high-speed engines now made, and to secure a more perfect distribution of the steam than it is capable of giving. The valve gear of Mr. Marshall is based upon a principle introduced many years ago by Mr. Hackworth, which has never before been properly developed. A number of engines are now at work fitted with this motor, and others are in course of construction. It was very favourably criticised at the meeting by Mr. Cowper, Mr. Robinson, and by Dr. Siemens, who remarked that the link motion was doomed to become a thing of the past. The link has done excellent work, and it will no doubt linger long yet with smaller and slower engines at all events. Its invention contributed largely to the success of the engines made by George Stephenson shortly after his works were established at Newcastle; it was invented by Mr. Howe, a pattern maker at those works. Mr. Howe was afterwards sent to Mr. Stephenson's collieries at Clay Cross, where he was engineer many years, and he died less than two years ago.

#### REPORT FROM THE FOREST OF DEAN.

Aug. 12.—A good deal of attention has of late been directed to the increase of local expenses, consequent upon the large outlay by the Sanitary Authority and the School Board. Large sums to construct the sewage works and erect school buildings, to be repaid from the rates by annual instalments during 30 years. These annual instalments have imposed upon the district a large addition to the rates, as compared with former years, which increase of burden many of the people find it difficult to bear. And not only do the poor and trading part of the inhabitants—miners and shopkeepers—but colliery proprietors and owners of other large works also complain of the large increase in the rates, which is a fact of some significance, as it has led to an attempt to remedy the evil. The Crown representatives have hitherto only contributed a 25th part of the poor-rate, but when that arrangement was made there were no schools and sewage works to provide for, so that all the additional expense beyond the poor-rates has fallen upon the residents. This is felt to be a great grievance, and members of the School Board and of the Sanitary Authority have complained and protested against the injustice. As the Crown represents the fifth man in mineral affairs, it is contended that the old arrangement should be abandoned, and that the Crown should pay one-fifth of the rates instead.

Some persons, for want of properly considering the matter, suppose that such things do not in the least concern questions of trade, but such a supposition is a great mistake, and these heavy additions to the local rates have fully convinced the owners of collieries and mines of the injustice of the Crown property being so far exempted from its share of the new burden. Acting on this belief a deputation of gentlemen, including Major Probyn, Mr. A. Thomas, and Mr. M. F. Carter, accompanied by the county members for the western division, had an interview with Mr. Howard at the office of Woods and Forests recently to represent the grievance, and, on the whole, the interview was encouraging. A remedy is likely ultimately to be applied; and when the Crown property is put upon a different basis to bear a larger proportion of the local burdens there can be little doubt but that it will have a happy influence upon local traders, as they and the general local public will get at least to some extent an equitable easement. Since our last report there has been a pleasing improvement in the coal trade, and should the harvest prove a good one it is thought that the progress will continue. The hardware trades are not in a brisk condition at present, orders being slack in coming in, and employment quite indifferent or irregular, with perhaps one or two exceptions. We hope, however, that things will soon present a general improved appearance.

#### REPORT FROM DERBYSHIRE AND YORKSHIRE.

Aug. 12.—Lead mining in Derbyshire has undergone but little change of late, the production of the mines, with a few notable exceptions, being comparatively trifling, so that those who work them must have enough to do to obtain a scanty living. The peculiar mining laws have certainly been taken advantage of by poor men, and one would say to their own loss, for it is evident that they would be much better off in working for others than being masters for themselves. In all probability more capital would have been invested in lead mines were it not for this state of things. Old as lead mining in the county is there are yet large reserves untouched, but to work them profitably there must be capital, so as to obtain the best machinery and most modern appliances. At the Mill Close Mine Mr. Wass has spent something like 20,000*l.* in engines, pumping machinery, &c., and the result is that the production is large—nearly equal to what is raised at all the other mines in the county. Lead mining in Derbyshire would be in a miserable state were it not for the spirit and enterprise shown by Mr. Wass, but there is no reason why Derbyshire should not obtain a much higher position as a lead-producing county than it now enjoys. Ironstone mining in Derbyshire has also been declining for several years past, and the large quantities of ore mined and raised in connection with the coal measures at one time have gradually declined to less than one-fourth of what they formerly were. It may be that the cost of getting was too much in comparison with what a superior quality of stone could be obtained from a distance. Now, a large proportion of the ore at present smelted comes from Northamptonshire, where it is obtained close to the surface at a small cost and at a moderate royalty. The business doing in pig-iron has improved of late, and the late advance fully maintained. In manufactured iron, however, there has been no material change, the business doing being still of a moderate character. At Dronfield the steel rail works are kept well going, and there is every appearance of there being plenty to do in this department for a considerable time to come. Malleable light castings, for which the same place has been noted for 100 years—a patent having been taken out for them by Sam Lucas in 1790—are now in tolerably fair request. The coal trade has not improved since my last notices, the demand for house qualities especially being very quiet and prices unremunerative, as they have been during the year so far. The business doing with the Metropolitan, however, keeps up very well for the time of year, more particularly from Clay Cross, Eckington, Grass Moor, and Blackwell. Steam coal goes off fairly, whilst a good deal is consumed at the local works. In other descriptions of coal there has not been any change worth noticing. A good deal of coke is being made at several collieries, and it appears to sell well, a considerable tonnage finding its way to Sheffield and the neighbourhood.

In Sheffield business, as a rule, continues active in nearly all branches, and orders from America and the colonies are coming rather freely to hand, so that there is every promise of a good

autumn trade. There has been a steady demand for pig, which has advanced in price, but purchases continue to be made rather freely. Mill material is in such request as to keep the hands fully employed. Ship-plates are being extensively produced, and there is a moderate enquiry for sheets and hoop iron. The make of Bessemer steel is heavy, as is the output of rails of that material, large orders being in hand for them as well as for general railway material. Armour-plates appear to be rather quiet; but this branch may be said to be in a state of transition, for the steel-faced plates must evidently carry all before them. Makers of telegraphic and other wire have been doing well, and the same may be said with respect to merchant iron generally. In crucible steel more is being done in castings, as well as for manufacturers; and greater activity is now anticipated. In general cutlery of the best qualities a steady business is being done, but principally for exportation, the home demand being quiet, and is not likely to get better until the harvest is got in. Some of the foundries are working well, but there is nothing in the shape of activity to be noticed; but now that the fine weather has apparently set in, there is likely to be an improved demand for cooking ranges and ordinary builders' castings. File-makers are much better off than they have been, whilst there is plenty doing in sheep-shears for foreign markets, our makers being able to compete with foreign goods hitherto sold at a low rate. At Attercliffe, Rotherham, and the districts round a steady trade is being done, and there are now few complaints as to shortness of work.

The South Yorkshire coal trade is still in an unsatisfactory state, the collieries being on short time, whilst the business being done is at a loss. House coal is difficult to sell, at a losing price, for the best qualities can be purchased as low as 7*s.* per ton, and other descriptions at from 5*s.* 6*d.* to 6*s.* There is not any difficulty, however, in selling steam coal, there being heavy consignments from the Humber to the North of Europe, whilst a considerable tonnage is also forwarded into Lincolnshire for smelting purposes.

Nearly all the men at the Barrow Hematite Company's Colliery have been discharged, as the company, it appears, can purchase their coke cheaper than they can make it. The men have issued a circular appealing to the public for support, as they say, to resist a great reduction of wages and serious alterations in the mode of working.

The horsenail-makers of Belper, who have been on strike for several weeks, have resumed work, the employers having conceded the extra 3*d.* per 1000.

#### REPORT FROM NOTTINGHAMSHIRE.

Aug. 12.—At the works engaged in the production of pig there has been a considerable output with a better sale of late, whilst the advance in prices, which has been general throughout the country, has been kept up. The Stanton Company have been importing a heavy tonnage of ironstone from Wellingborough, in Northamptonshire, which is of good quality, and is producing iron that is adapted for almost any purpose. At some of the foundries a fair amount of business is being done in general castings, but at others business is quiet. Engineers are by no means active, whilst wagon builders are not so busy as they have been. The coal trade continues quiet, and so far as regards household fuel no change for the better can be looked forward to for at least the next two months, when it is to be hoped that not only will there be a much better demand but considerably better prices, seeing that those that have ruled in the market for some time have not been such as to pay colliery owners. Still the coal proprietors of Nottinghamshire have done probably as well as those in most other districts. The Clifton Colliery, near to the town of Nottingham, in addition to its local sales, has been sending about 700 tons of coal weekly to the Metropolis. The proximity of the Nottingham coal field to the Metropolis, combined with a lower rate than from the more northern districts, gives it a great advantage, and this has been cultivated most sedulously by several colliery proprietors, and the result is that, considering the comparatively few collieries in the county, more business is done by them with London than there is with far larger fields. Of course price and rate are everything, and there is a fair tonnage by most of the lines to the south. The Hucknall Colliery, in the Nottingham district, is a well-known one, and last month there was forwarded from it 11,500 tons of coal to the Metropolis; whilst there was sent from Annesley 10,400 tons, Bestwood 5000 tons, and Linby 9260 tons. In fact four collieries sent during the month of July no less than 36,300 tons to the metropolitan market. In connection with the "Top-hard" seam there is some good hard or steam coal, well adapted for iron smelting, and for which a good deal of it is used, and this of late has gone off somewhat freely, but at prices much lower than they ought to be for the time of year. Engine coal has sold tolerably well considering the state of trade generally, as has also other descriptions of small coal. The pits, however, have not been working full time, but are fully as well off as those in the neighbouring county. The best coal now sells at from 7*s.* to 7*s.* 6*d.* per ton. In connection with the coal measures ironstone is raised, but to a very moderate extent, as it appears that it can be had from a distance equally as cheap as it can be locally raised. The output has only been a few hundred tons weekly. The coal formation, it may be said, consists of an accumulation of beds of sandstone, clay, coal, and ironstone, alternating with each other, and of course as the coal is the most valuable not much attention is paid to the iron ore.

#### REPORT FROM NORTH WALES, SALOP, AND CARDIGAN.

Aug. 11.—A terrible colliery accident, resulting in the loss of nine lives, has taken place at the Bersham Colliery, near Wrexham. This is a comparatively new colliery, which is in the course of development; it is situated on the eastern or deep side of the North Wales coal field, and is owned by the Messrs. Barnes, who are well-known coal merchants at Birkenhead. Drivings are being pushed forward in the main coal, which here lies at a depth of 430 yards. A shot fired in one of the drivings ignited a blower of gas, which set the pit on fire. The men, 70 in number, came safely to the surface, when Mr. Pattison, the manager, organised an exploring party with the view of limiting and extinguishing the fire. While they were doing this, a little after 10 o'clock at night, an explosion of gas took place, which shook the whole district, and killed the manager, Mr. Pattison, and seven of his workmen. An eighth, named Valentine, was brought to the surface alive, but badly burnt and bruised; he was able to give some evidence, but the poor fellow died also yesterday morning. Mr. Pattison was well known and esteemed in the district as a colliery manager; about 400 people attended his funeral at Esclersham on Friday. One of the colliers, Edward Owen, who was much esteemed, was buried at Chirk on Sunday. The clergyman, at the request of the Nonconformist friends of the deceased, gave out a hymn which was sung with impressive effect by the 500 persons who were present. All the men were married, and between 40 and 50 children are left fatherless. Unhappily, too, this colliery did not belong to the Miners' Relief Fund. A local paper, with very bad taste, makes the sad occurrence one to which, spite of all precautions, the best regulated collieries are liable, the text for a lecture on the recklessness of colliers generally. Many men among them are without doubt reckless, but this sad accident is not an illustration of the fact, and the reflection upon the men might well have been deferred.

The Preesgwyn Colliery is again in active operation, and its newly painted wagons are seen along the railways. It is a pity, however, they have not had the name of the colliery spelt properly—"Preesgwynne" is neither Welsh or English. The Brynkinalt Colliery Company seemed determined to do a trade, and I wish they success, but it is seldom that the manner of advertising adopted by them leads to permanently good results.

A bed of excellent slate is said to have been discovered near Llanarmon, Mynydd Mawr, which will increase the slate-producing area of the Tanat Valley against the time when a railway shall be constructed in that direction.

A new industry has sprung up near the town of Llanfyllin. A work first of all, I believe, started as a phosphate mine, then as a slate quarry in the beds associated with the Bala limestone, has been found not so productive in roofing slates as in writing slates, and of slates of various kinds. In the former articles, which are said to be of superior quality, a large trade is springing up under the management



of Mr. Walsley, an old and ardent miner. The Brithdor Slate and Slab Company, as it is called, has bought the plant formerly belonging to the Aberglanwyl Slate Quarry for this manufacture, and the slates and frames are all manufactured on the spot.

The Oswestry Corporation having gone to the trouble and expense of getting a clause inserted in the Liverpool Water Bill for a supply of water from the Liverpool mains to their town, have now done what they ought to have done long ago—agreed to make a reservoir for the collection of the storm water at Penygwely, the source of their present water supply.

A report is current that a gentleman well known in mining circles in London has bought the Bog and Pennerley Mines, in Shropshire, with the intention of adding them to the Tankerville, and so work the three mines under one management. Any steps in the direction of efficient economy are praiseworthy. Possibly we shall hear more of this movement presently.

The plant of the Potteries Shrewsbury and North Wales Railway is to be sold, and the railway dismantled, and thus for the present ends one of the great projections of the railway mania years of 1863-4. This line was intended to extend from Staffordshire into North Wales through the Berwyn to Bala. Had this Welsh portion been made instead of the erection of the costly works at Shrewsbury, now occupied by the Midland Wagon Company, a different result might have ensued, much to the benefit of the district.

I met a Canadian the other day who, after having been a gold digger, wood cutter, and farmer, had, he said, got into a better way of making money by money lending. He was, he said, then receiving 10 per cent. interest on his "promise to pay." Now, this was an example of the growth of gold on a white matrix, which will, I think, beat Mr. Readwin's hollow. However, the growth of gold and the multiplication of the precious metals generally is a process so foreign to my experience, unhappily, that I do not feel myself competent to criticise Mr. Readwin's interesting letters. I take his suggestion, and say I do not know. Then with all hope that gold does exist in Merionethshire in quantities that will pay for working, I think we had better not, with "A. U. R.," talk in the meantime of "reefs." It is a pity when a good mine for one mineral is saddled with the expectation of yielding another it was never intended to, so that I am sorry "Observer" is presuming that the Wetherston Barytes Mine will become a lead mine. This, I fear, is geologically and mineralogically improbable.

#### PRACTICAL MINING—SPRAY VENTILATION.

With regard to dry and wet levels, Dr. C. LE NEVE FOSTER remarks in his recent report that persons accustomed to visit mines are sure to have noticed that a level with much water dripping from the roof is generally better ventilated than a dry one. The air is not only cooler, but it is clearer, on account of the solid particles which were floating about having been beaten down. Miners have recognised this fact, and dash about water in an end and throw it down a shaft, in order to clear away the smoke a little. It struck Dr. Foster in 1878 that it would be worth while trying the effect of a continuous artificial rain in ends after blasting. He mentioned the matter to Mr. A. E. Preston, the engineer in charge of a contract for driving a level at New Cook's Kitchen Mine, where there was a pipe with a good head of water for keeping the bore-holes wet during drilling. Mr. Preston then told him that his men had been in the habit of taking the end of the water-hose and scattering the water about with a beneficial effect. After trying a rose at the end of the water-hose at his suggestion, Mr. Preston turned the water-pipe into the air-pipe, and produced a spray which had a powerful effect in clearing the air from smoke. As the blasting was done in volleys, and as each set of holes was not charged until the previous volley had been fired, a rapid means of clearing the end from smoke was important, in order to enable the blaster to proceed with his work with the least possible amount of inconvenience.

After a trial of some weeks Mr. Preston informed him that he calculated that the introduction of the water spray saved him two hours a day when driving an end with dynamite in dry ground, by reducing the intervals required between the volleys. Dr. Foster subsequently made a trial himself at New Cook's Kitchen Mine in an end where powder was the explosive employed. He simply fixed a spray diffuser, such as is used on little garden engines, on to the water-hose, and the miners were unanimous in declaring that the spray aided considerably in beating down the smoke and clearing the air. He believes that the water spray is valuable not only for washing out the solid particles of smoke, but also for dissolving any nitrous fumes which may be produced in blasting with some of the newer explosives. Major Ford, R.A., H.M. Inspector of Explosives, reported last year upon some deaths caused by nitrous fumes evolved in firing with dynamite in a tunnel. Dr. Foster thinks there can be no doubt that all danger from these fumes might be averted by a liberal use of water in the form of a fine spray. One of the makers of boring machines, Mr. Schram, has also discovered the benefit of an artificial rain, and recommends its employment in driving and sinking.

#### Registration of New Companies.

The following joint-stock companies have been duly registered:—

**LILWALL BROTHERS AND COMPANY (Limited).**—Capital 10,000*l.*, in shares of 5*l.*. To purchase a business in Worcester, and carry on the business of chemists and the manufacture of cattle medicines, &c. The subscribers (who take one share each) are—E. J. Morris, 109, Crofton-road; J. V. Yonge, New Cross; G. M. Simmons, Balam; J. Ward, Rosherville; W. Baker, Worcester; G. H. Lilwall, Fladbury; T. H. Lilwall, Newport.

**THE "ENVOY" STEAMSHIP COMPANY (Limited).**—Capital 12,512*l.*, in shares of 195*l.* 10*s.*. To carry on the business of shipowner, limited to one vessel at a time. The subscribers are—T. C. Ball, Saltburn-by-the-Sea, 2; J. J. Smith, Middlesborough, 1; J. Walton, Middlesborough, 1; J. C. Simpson, Saltburn-by-the-Sea, 1; S. Walker, Middlesborough, 2; R. C. Bacon, Middlesborough, 1; H. Hawes, Middlesborough, 1.

**LONDON AND DISTRICT OMNIBUS COMPANY (Limited).**—Capital 200,000*l.*, in shares of 10*l.*. To carry on generally the business of an omnibus and cab company. The subscribers (who take one share each) are—W. Robinson, 7, Poultry; H. Moulding, Bernondsey; F. McMahon, 61, Wenlock-street; E. S. Parker, 25, Gibson-square; S. Norman, Uxbridge; A. Hanson, Bexley; H. J. Kelly, Upper Teddington.

**THE INTERNATIONAL SUBMARINE TELEGRAPH COMPANY (Limited).**—Capital 125,000*l.*, in shares of 20*l.*. To carry on the business of a telegraph company in connection with a concession granted by Portugal. The subscribers (who take one share each) are—A. E. Chamber, South Norwood; R. H. Plater, Hornsey; F. W. Smith, 15, Golden-square; G. T. Hough, Stratford; T. Jones, Clapham; F. J. Lee, 15, Eardley-crescent; A. Hall, 88, Lansdown-road.

**THE BLACKWATER OYSTER BREEDING COMPANY (Limited).**—Capital 17,950*l.*, in shares of 5*l.*. To carry on the business of fish and oyster breeding, fish merchants, &c. The subscribers (who take one share each) are—Lord Somers, Eastnor Castle; A. Birch, Worcester; Sir C. Lindsay, 4, Cromwell-place; G. Chandler, 15, Coleman-street; F. W. Poxley, 15, Coleman-street; G. B. Loundes, Halford; E. Relf, 15, Coleman-street.

**THE CLOAG MINING COMPANY (Limited).**—Capital 30,000*l.*, in 12 shares. To acquire, manage, and work certain mines, minerals, and properties situate in the parish of Llanfer, Merionethshire, and all other mines and minerals comprised in a lease granted to the company. The extraction, smelting, or reduction of ores, and the realisation of the produce of such mines. The selling, letting, or otherwise disposing of any mines, mining rights, or any other property from time to time acquired by the company. The subscribers (who take one share each) are—W. Staples, 4, Royal Exchange Avenue, stockbroker; H. Wilson, 53, Old Broad-street, broker; W. B. Davies, 2, Devonshire-terrace, mining engineer; W. Ash, 119, Camden-road, merchant; A. Vickers, 34, Old Broad-street, director; W. J. Cundell, 34, Old Broad-street, manufacturer; E. Start, 110, Shacklewell-lane, clerk. The subscribers will nominate the first directors, whose number must not

be less than three or more than five. The qualification is shares or stock to the value of 100*l.*

**THE GRAVESEND AND NORTHFLEET CO-OPERATIVE STORES (Limited).**—Capital 20,000*l.*, in shares of 1*l.*. To carry on the business of a co-operative society. The subscribers (who take one share each) are—J. W. Terry, Munster-square; A. Watt, Old Charlton; G. F. Dunn, 4, Furnival's Inn; W. T. Wilson, Ifield Wood; A. C. Dockerill, Dalston; J. D. Johnstone, 45, Chepstow-place; G. Cook, Wood Green.

**CORBIERE, HAINES, AND BRINDLE (Limited).**—Capital 30,000*l.*, in shares of 10*l.*. To acquire and carry on a business in Cannon-street of importers of velvets, damasks, silks, &c. The subscribers are—E. W. Haines, 16, Cottage-road, 300; J. Brindle, 32, Hillmorton-road, 100; W. A. Le Motte, 63, Forbes-road, 1; J. Mills, St. Bartholomew's, 1; C. E. Wilson, 65, Basinghall-street, 1; W. E. Stevenson, Great Ormond-street, 1; B. G. Haines, 12, Albert Mansions, 200; W. C. Owen, Pall Mall Club, 1.

**THE MUTUAL STEAM SHIPPING COMPANY (Limited).**—Capital 1,000,000*l.*, in shares of 20*l.*. To carry on a shipowner's business on the mutual benefit principle. The subscribers are—Lord Brabourne, Ashford, 25; W. L. Darke, 21, Billiter-street, 25; E. Hatton, 72, Old Broad-street, 25; A. Holland, 17, Leadenhall-street, 25; E. P. Stringer, 36, Leadenhall-street, 25; W. Maine, Hammersmith, 25; W. Benshalpin, 5, Broad Sanctuary, 15.

**MANCHESTER IRON AND NAIL COMPANY (Limited).**—Capital 10,000*l.*, in shares of 1*l.*. To carry on the business of iron merchants, nail manufacturers, ironmongers, &c. The subscribers are—W. Barlow, Manchester, 20; T. Pickin, 81, Bridge-street, 2; T. Barrow, Manchester, 1; T. Barlow, Pendleton, 2; W. R. Fisher, Salford, 1; R. Whitehead, Manchester, 1; T. Jacks, Salford, 1.

**THE HUNGARIAN PETROLEUM AND OZOKERIT COMPANY (Limited).**—Capital 6000*l.*, in shares of 1*l.*. Adopting an agreement for the boring and prospecting for petroleum, earth wax, and other substances, and carry on such and similar operations in Hungary. The subscribers (who take one share each) are—J. Walsh, 26, Cromwell Grove; R. E. Davies, 30, Ladbroke-square; T. H. Davies, 13, Grafton-street; J. Ladbury, 8, St. Andrew's-place; M. E. Jobling, Kensington; W. Curlyne, Claremont-road; R. H. Gibbons, 11, Goldney-road.

**THE TEMPERANCE AND GENERAL ADVANCE AND INVESTMENT COMPANY (Limited).**—Capital 10,000*l.*, in shares of 5*l.*. To make cash advances on all kinds of securities. The subscribers (who take one share each) are—E. Hirschorn, 26, Bishopsgate-street; F. Stone, Manor Park; T. Bridge, Crouch End; T. Gardner, Leyton; J. Wells, Ilford; H. J. Ball, Stoke Newington; J. D. Hobson, Romford.

**THE DERBY AND DERBYSHIRE BANKING COMPANY** is incorporated as a limited liability company.

#### Meetings of Public Companies.

##### CESENA SULPHUR COMPANY.

The ordinary general meeting of shareholders was held at the offices of the company, Finsbury-circus, on Saturday, the 7th inst., Mr. HENRY LABOUCHERE, M.P., in the chair.

Mr. R. LARCHIN (the secretary) read the notice convening the meeting. The reports and accounts were taken as read.

The CHAIRMAN having expressed his regret that Mr. C. Schiff (the Chairman of the company) was unavoidably absent, said the reports showed that the half-year's operations had resulted in a loss, and as a director and shareholder he had been enquiring as to how this occurred, and he found that it arose in the main from the fact that a large French company had been formed in Italy, and had brought in an enormous quantity of sulphur from Sicily. This had reduced prices in Sicily and naturally also in Italy; and at the present time that company was working absolutely at a loss. If they had to compete with people who were willing to work at a loss, what were they to do? Of course, if persons could get sulphur at one rate it was not likely that they would pay this company a higher rate. Mr. Kossuth would explain to the shareholders the circumstances of the company, and what were the probabilities with regard to its future. The main origin of the unfortunate state of things was that there had been two very bad years for the vines, and they had not been able to keep out the *philoxera*. The consequence of this was that at the commencement of the year they had very large supplies on hand, and these would have to be sold before normal prices could be obtained. What he knew about the mine he had learned from Mr. Kossuth; and as that gentleman was present it would be better that the shareholders should have the information from the original source.

Mr. FRANCIS KOSSUTH (managing director) said—Gentlemen, I fully share the regret that any shareholder may feel at the unsatisfactory result which last year's working has shown. I share it from a double point of view; first, as a holder of a comparatively large number of shares, for the larger portion of which I paid a premium over and above their nominal value, and, secondly, I share that regret as the managing director of this company, who has given his very best abilities to promoting our social interests, and who sees himself frustrated of the satisfaction that success would give by causes which are entirely beyond his or anyone's control. I have already pointed out in my report (which I presume all present have read) that the fall in the selling prices of sulphur in the Italian market has depreciated the value of our production by 20,582*l.* during the year; it is unquestionably true, therefore, that to this depreciation of value is owing entirely the loss we have sustained, because had the prices remained what they were for several years (to begin with the time when the company was formed) instead of showing a loss of 8983*l.* 15*s.* 2*d.* in our balance-sheet, we should have been able to divide a profit of 11,603*l.*, this sum being the difference between the said loss and the said depreciation of the value of our production. You will, therefore, agree with me in blaming wholly and exclusively the deplorable state of the sulphur market for the unsatisfactory result we show. In fact, the prices have kept on falling ever since we have been placed in a satisfactory working position at our principal mine, so that we may fairly claim to have been most unfortunate. As our deficiency arises from the deplorable condition of the Italian sulphur market, the following questions may naturally present themselves to the mind of every shareholder: first, what are the causes of the considerable fall in prices; secondly, what are the limits to the said fall; thirdly, what are the prospects of an improvement; and, fourthly, whether we can work at the present selling prices without an unavoidable loss. I shall briefly give my views on each of these points. The considerable fall in prices of sulphur is owing to the fact that at one time Romagna sulphur alone was used for sulphuring the vine in Italy, and a few years ago large Sicilian sulphur refineries were established, which to a great extent successfully assailed the tendency of the market to exclude Sicilian sulphur; and while the production of Romagna sulphur was very limited in proportion to the demand, prices ran high when this sulphur alone was used; but the production of Sicilian sulphur was so great that the new branch of trade opened for it through the said refineries in Italy did not by any means influence its selling price. The refined sulphur market in Italy was overstocked, the supply of sulphur having been considerably increased through the erection of the Sicilian sulphur refineries, whereas, through meteorological and temporary causes, the demand had been during the last two years greatly diminished. The evident consequence of this was a great fall in prices, and now I am naturally led to answer the second question. The fall in the prices of the refined sulphur in the Italian market is limited by the possibility of producing the same by importing rough sulphur from Sicily to the Peninsula, and by refining the sulphur with a profit. It has so happened that while the prices of refined sulphur were falling those of rough sulphur in Sicily were rising considerably, and the point was reached when it became impossible to refine and sell Sicilian sulphur in Italy at a profit. However, the sulphur refiners had a large stock on hand, which it was beyond their power to hold for a lengthy period; hence a further fall of prices was unavoidable, notwithstanding the fact that the current prices were so low that on every ton of Sicilian sulphur refined and sold there was a clear loss of from 10*s.* to 15*s.*. No one owning establishments that can be closed without any damage will submit to continue to work at a clear loss; hence it was evident that all the Sicilian sulphur refineries would stop, as they did actually stop, and now all of them are closed. The lowest limit in prices has, therefore, been reached, and it is from 4*s.* 2*d.* to 4*s.* 5*d.* per ton refined, and this limit is only artificially formed by the course which I have already pointed out, and which is the necessity imposed upon many holders of stock in hand to sell out at any price. As to the prospects of an improvement they emerge from the fact that the supply of the market with Sicilian refined sulphur is completely stopped, while the supply of Romagna refined, on the whole, is considerably below that quantity which, when this sulphur alone was used, had through its scarcity produced and kept up for years very high selling prices. Hence the supply at the present date is again far below the amount of the demand, and when the retail demand will be carried away the remainder, there being no production except of the Romagna sulphur, the prices must necessarily rise. The limit to an improvement in prices as matters now stand is clearly fixed by the point at which it becomes possible to purchase, transport, and refine Sicilian sulphur, and make a small though fair profit on it. The prices of Sicilian sulphur remaining what they now are this would necessarily bring about a rise of about 1*l.* per ton on the present prices, as I have just stated. I have now only the last question to answer, referring to the possibility of our working at the present selling prices without a loss, taking it that the present state of affairs should exist for another half-year, as it is almost sure to do. To this question a careful perusal of my report would fairly give an answer, inasmuch as I show in it that all the causes (except the fall in prices) which contributed to make up the loss in 1879 had been strictly

temporary, and that they had all disappeared. I have also shown that the fall of prices, had not those other causes existed, would still have left a small margin of profit. I have, however, also clearly hinted at the fact that the possibility of our working without a loss at the present prices wholly depends on the quality of the mineral, and consequently on the yield. If the quality were as bad as it had been in 1878 and 1879, I must clearly state that at present prices we could not work without a loss. I am glad to be able to add, however, that fortunately the quality, and hence the yield, of our material has shown a very timely improvement, which amounts to an advance of 2 per cent. This circumstance has allowed us to work from the beginning of this year (1880) till the end of last month (July), to work not only without a loss but even with a small profit, which was used to cover outstanding liabilities. Again, therefore, we are wholly dependent on a circumstance which is entirely beyond our control, and all we can do is to get as much as possible out of our mineral; but we cannot improve on its quality. I feel bound to allude to the fact that it is impossible for us this year to pay the half-yearly interest to the Italian Sulphur Company, which arises from the fact that we have not only been unable to sell our stock in hand, but the value of the same at the present selling prices, taken nominally, leaves us an open balance on the side of our liabilities of about 10,700*l.* This, no doubt, is a very unfortunate circumstance, but I believe it will have no disastrous effect on the future of our company. In any case we will do our best to protect this company's interests with every means which circumstances afford, and while recognising our liability to pay, and pledging our readiness to do so as soon as we can disentangle ourselves from our present overwhelming difficulties, we cannot hesitate in our decision to resist any attempt to affect us permanently and deeply for no other reason than this temporary adjournment. I have no reason, however, to suppose that any such attempt would be made, considering that such commercial difficulties rendered it impossible for us to earn and pay the interest, which would also render it impossible for the Italian Sulphur Company (were this company to work the mine) to earn the money and to pay its debentures, supposing even that that company disposed of the capital necessary to work Boratella. Our position during 1879 has been fully explained in my report, and while I am quite ready to give any further explanation on any point that any of my fellow-shareholders would consider not fully elucidated, I would fear to trespass on your time and attention by returning to those details. I may, however, venture to point out that a true standard for measuring the successful protection of our common interests is not always solely the amount of money available for dividend. We always were in a position very unfavourable for large dividends. Our capital to pay interest on was always large; it was increased by a heavy debt, and we were placed in the unavoidable necessity of spending on our property and on the means of carrying on our business most of the earnings we made, because we had no capital reserved for this purpose. But if not more than 26,740*l.* were distributed inclusively in dividends, this does not by any means imply that much more was gained. I have already had occasion to point out that 41,465*l.* was spent on putting Boratella into a largely productive order; 23,168*l.* on exploring the numerous secondary mines, which surely could not have been given up after having been bought without a clear knowledge of their value; 5320*l.* was spent on refineries and storehouses, the standard selling article being the refined sulphur; and 26,556*l.* was paid to the Italian Sulphur Company. These items added together make 129,427*l.*, out of which 40,000*l.* having been borrowed from the Italian Sulphur Company, there remains 89,427*l.*, which has been earned in hard cash. To those who are disposed to measure by the standard of dividends alone, without considering either the circumstances inherent in the clearly apparent position of the company, or the circumstances of the trade, I might point out that often, and indeed generally, it is much more difficult to keep alive a sick man suffering severely from diseases acquired in earliest infancy than to minister to the bulky prosperity of a fellow-creature in full bloom of health. The constant and unwavering care that the sick man requires is a less grateful task; and yet I may conscientiously state that such never-failing attention and such energetic care has been constantly given by me to the sick man called the Cesena Sulphur Company, and I may be excused if I yield to some extent to disappointment, seeing that my efforts are now frustrated by causes wholly beyond my control, and most disastrous in their unavoidable effects. However, it may be a satisfaction to know that our concern has all this year produced a regular and steady output. Our production during the first half of the year was 4500 tons, and the production in July was particularly large, it having amounted to 1147 tons. This very large production was not obtained without a strenuous contest against barren plots, and it may be pointed to by myself, as a mining engineer, with perhaps not unjustifiable satisfaction, which is marred by the regret that so fine a result, both technical and administrative, should be prevented from bringing its fruits to the shareholders by the depreciation of the marketable value of our productions. However much this circumstance may be discouraging to one who feels and can venture to say he has done all that was humanly possible to promote your interests, I shall nonetheless pursue my task with the same energy, true to the French motto, "Fais ce que devras, adieu que pourra." (Applause.)

Mr. KOSSUTH, in reply to Mr. EDENSOR, stated that the loss made was wholly owing to provisional difficulties, particularly with regard to Boratella, which was only closed last year. Even at the present low prices of sulphur there would be a small margin of profit on the actual operations at the mines.

The CHAIRMAN, in reply to the same SHAREHOLDER, said that the full amount stated to have been paid for the property was actually paid, as Mr. Edensor could see by referring to the books of the company, the whole of which were then and at any other time open to his inspection.

Mr. EDENSOR, in the course of some further conversation, referred to the original formation of the company, and apologised for making a reflection on one of the directors.

On the motion of the CHAIRMAN, seconded by Mr. LYNCH, the report and accounts were unanimously adopted.

The retiring directors, Messrs. H. Labouchere, M.P., and J. Stanforth, were re-elected; and Messrs. Carter and Clay were re-appointed auditors.

On the motion of Mr. FARIS, F.G.S., seconded by Mr. DEACON, a vote of thanks was passed to the Chairman and directors; and the meeting then closed.

##### ENGLISH AND AUSTRALIAN COPPER COMPANY.

The half-yearly general meeting of shareholders was held at the Cannon-street Hotel on Thursday.

Mr. R. A. ROUTH, the Chairman, presiding.

Mr. C. B. ROGERS (secretary) read the notice calling the meeting.

The CHAIRMAN said there was really no business to transact to-day, and the principal remarks he had to make to them were with regard to the half-yearly accounts, and he would afterwards make one or two observations with regard to the position of the company. During the past six months they had received from the various mines 6235 tons 12 cwt. of ore, regulus, and precipitate, against 4718 tons 11 cwt. 1 q. in the corresponding period of the previous year. The quantity of ore, regulus, and precipitate smelted at Port Adelaide and Newcastle Works was 5186 tons 5 cwt., as against 4833 tons 4 cwt. 2 qrs. The quantity of copper made was 885 tons 5 cwt. 1 q. 11 lbs., against 811 tons 19 cwt. 20 lbs., and the quantity of copper shipped and sold in Australia was 889 tons 2 cwt. 16 lbs. as against 810 tons 1 cwt. 1 q. 14 lbs. When he had the pleasure of addressing them in August, 1879, there was an adverse balance, showing a loss of 1253*l.*; on the present occasion the directors had the pleasure of stating that the estimated profit was 2590*l.* 12*s.* 4*d.*, showing at all events on the amount of work done that there had been a fair and reasonable profit. When he met them in February the price of copper was then 77*l.* 10*s.*, but in consequence of speculation the price fell, and it was now 70*l.* per ton. The result of this was that they did not make quite so large a profit as they otherwise would have done. But the real point to look at was that the working of the mine was suspended with 6235 tons, whereas the quantity which they generally calculated to get was 10,000 tons. With respect to the cause of this, when the very low price of copper commenced many of the mines went out of work altogether; but he was happy to say that the latest information showed that they were gradually getting into work again, so that no doubt a larger quantity of ore would be got from them, and until they did get a larger quantity it was impossible to make much larger profits. They had had some very good ore from Numea, and he thought that in all probability they would still receive a very considerable quantity from there. Directly the price of copper was at 70*l.* per ton, the price of the mine was suspended, and the price of copper was working back—it had been as low as 68*l.*, and was now about 70*l.*—and if the price of copper remained where it was at present there was no doubt a large quantity would be produced from the mine. As regarded the Far North he would say one or two words. The railway, which was commenced in 1878, was rapidly being made, and about 80 miles were now open, and the remainder was being pushed forward rapidly for another 60 miles. When the line was opened another 60 miles it would touch a great number of mines, containing large quantities of ore; and the directors were in hopes that from the period when the railway was finished, which might be a year or a year and a half—the difficulty which the company had had with regard to the quantity of ore would be done away with, and the only question would be whether they could smelt as cheaply as other people. Upon that point there was not much doubt, for the company had excellent works at Newcastle, and they got their coal cheap, and he hoped that when they did this larger volume of business they would have a much greater profit. Looking at the six months, and looking at the fall in copper (without which they could have obtained a dividend), he thought they would agree in thinking that the directors had acted wisely in carrying over the amount of the profit of the year, when the accounts would be made up, and the stock taken; and he had every reason to believe that at that period the directors would be able to declare a dividend which would be satisfactory. The board felt it would be very imprudent to divide a small sum like that at the present moment, because they could not tell what was in the hands of fate and, therefore, it was better to reserve it for the present. During the six months there had been a strike at Newcastle, which, however, had not affected them to any great extent. At one time it drove up the price of coal to 14*s.* 6*d.*, and then reduced it to 12*s.* 6*d.*, for large coal; but during that period the company had fortunately engaged in stock to enable them to go on with their work, and also at Adelaide, therefore the strike did not affect them so much as it might have done. The directors were in negotiation for contracts for very large quantities of ore. He would not say more about it at present, but he believed that if they were carried out they would be attended with very satisfactory results.

A SHAREHOLDER asked why the quantity of copper in stock was larger?—Mr. A. CORBETT (deputy chairman) said the quantity of ore in stock depended upon the quantity purchased. At the time the accounts were made up the company had purchased considerable quantities of ore, which would be in stock. It was generally the desire of the manager when he took stock to reduce the ores then upon the floors, and smelt up as close as he possibly could.

The CHAIRMAN, in reply to a SHAREHOLDER, said the railway to which he had alluded commenced at the head of Spencer's Gulf, and would run 200 miles up the country. There would be a large station at the end close to the Gulf, and the company had secured land there for the erection of works. When that land was bought it was not so valuable as now.

A SHAREHOLDER said the expression "Far North" was a little hazy, and asked to what particular district the term applied.

Mr. ROUTH said the "Far North" was a term applied to a district almost incomparably rich in copper ore of the very highest class. The Yuda-namutna and other mines had been prevented from working from the cost of carriage, and the shareholders would be able to judge of the richness of the dis-



trict when he mentioned that the Government had raised a loan in this country for the express purpose of making the railway.

Mr. J. R. FLEWELLER said the line would tap a district as rich as Devonshire and Cornwall. They could not expect that the district would be opened to any great extent for some years, but the Government had seen the immense value of the country as a mining district, and had had the line surveyed for 200 miles, and it was opened more than 80 miles.

Mr. ROBINSON thought that a small dividend might be paid.

The CHAIRMAN said the directors had carefully considered the matter, and had come to the conclusion that it had better be deferred until the accounts were made up at the end of the year.

The meeting then broke up.

#### THE ARUBA ISLAND GOLD MINING COMPANY.

A special general meeting of shareholders was held on Monday, at the offices of the company, Gresham House, Old Broad-street, for the purpose of considering several resolutions affecting the capital of the company, passed on the 25th ultimo.

Mr. J. V. SMEDLEY (the Chairman of the company) presided.

Mr. A. MACKENZIE (the secretary) read the notice calling the meeting, and the resolutions, which were to the following effect:—

That the capital of the company be increased by the issue of new shares in the aggregate amount of 25,000l., to be divided into 25,000 shares of 1l. each, to be issued as fully paid-up, with a preferential right to dividends at the rate of 25 per cent. per annum, such dividends, if not paid when due, or only partially paid, to accumulate from year to year, and to be paid out of and to be a first charge upon the future net profits to be received by the company in priority to any payment of dividends on the existing ordinary shares of the company, and with a right to priority in the distribution of assets over the existing share capital.

That the preference shares above referred to shall participate rateably in half the remaining net profits after a sum equal to the aggregate amount paid to the said preference shareholders as representing their fixed dividend of 25 per cent. per annum shall have been divided amongst the ordinary shares of the company.

That the shareholders be empowered to treat with the existing debenture holders and other creditors of the company for a surrender or assignment of their overdue and still unpaid debentures and coupons and other debts or claims on the terms of exchanging, assigning, or releasing the same to the company in exchange for such fully paid-up 25 per cent. preferential shares of the new issue, amounting nominally to the same amount as the said unpaid debentures or coupons and other claims, with interest at the rate of 10 per cent. per annum, calculated to whatever period may be arranged between the directors and the respective debenture holders and creditors, and such preference shares may be allotted at periods to be agreed upon between the directors and the debenture holders.

The remaining resolution gave power to the directors to conclude agreements for giving effect to the above resolution.

The CHAIRMAN said it was unnecessary for him to say more than that this meeting was called in conformity with the Company's Act, and his duty was simply to move that the resolutions be affirmed.

Mr. ARTHUR CHAPLIN seconded the motion, which was carried unanimously.

#### PATELEY BRIDGE COMPANY.

The ordinary general meeting of shareholders was held at the offices of the company, Austinfriars, on Tuesday.—Mr. BAXTER in the chair.

Mr. W. J. LIVINGSTON (the secretary) read the notice convening the meeting. The reports and accounts were taken as read.

The CHAIRMAN said.—On the last occasion that the directors invited the attendance of the shareholders it was to ask their sanction to a scheme of reconstruction, and he must say that the unanimity with which that scheme was accepted was very gratifying to the board. The shareholders accepted the scheme, and found the money asked for with very great liberality, and it was a source of great regret to the directors that the expenditure of that money had not proved a success. The only consolation the directors had—and it was a small one—was that they had done everything that a board could possibly do to promote the interests of the company. They had watched the expenditure of the money and the operations at the mine with as much care, as much attention, and as much vigilance as if it were their own private property, and more than that they could not do. They had not failed to call the attention of the manager to any matter which in their judgment could promote economy or bring about better results, but, unfortunately, their efforts had not been successful. It might be remembered that part of the plan which was recommended by the late agent of the company was to sink from the 30 to the 40 fm. level. They had had a very good, powerful, and productive lode at the 30, and the late agent, Captain Charles Williams (who was perhaps of a somewhat too sanguine temperament) strongly advised them to continue the sinking. For this purpose it was necessary to have much more powerful machinery than the old engine which had done the pumping and drawing, which was quite inadequate to the sinking to a greater depth. The board after consideration submitted the matter to the shareholders, who concurring with them sanctioned the purchase of the machinery, which the directors afterwards bought at a cost of about 1000l. They had now been obliged to abandon the sinking below the 30, not because the machinery was not capable of dealing with the water, but because their financial position did not enable them to do so—they could not keep the water out and work the mine at a profit. In April last Capt. Charles Williams resigned his appointment, and it became a question for the directors to appoint his successor. After giving the matter the best consideration in their power, they thought they would promote the interests of the company best by appointing Capt. David Williams, who had probably had more experience in that district than any other man, and he had promised in undertaking the management to give all the time, care, and attention necessary. As soon as Capt. David Williams entered upon his duties the directors placed before him the exact position of the company in every way; they told him how they stood, and asked him to go over the whole of the operations and carefully consider them in every way, to look at the points most likely to come into early productivity, and to advise them generally as to the future operations of the mine, having regard to the financial position of the company. Capt. D. Williams had no hesitation in advising them at once to abandon the works below the 30, and to resume driving operations from the 20 and 30 east. These cross cuts had been up to the present time through unproductive ground, but in one of the cross-cuts the lode had been cut, and it was now productive, and there were two or three points where they were probably near to intersecting the lode, and Capt. D. Williams without being sanguine believed that they were approaching a lode which was known to be most productive, and he fully anticipated cutting it during the present month. If he cut that one point and it turned out as productive as he expected it would, it would enable him not only to pay the wages of the costs but would leave a small margin over and above them. Other points were being carried on, and the directors hoped and believed that they would be in a position very shortly to more than pay the costs, and to accumulate a little money to enable them to pursue other operations; but whether they would succeed or not was more than he or anybody else could tell them absolutely. He could tell them exactly the financial position of the company at the present time. They had made the last call, as the shareholders were aware, and that would produce them 442l., the arrears of the former calls amounted to 298l., and cash 51l.—making 991l. They had sundry debts amounting to 65l., and a loan of 300l. from the Alliance Bank. With regard to this loan he should tell them that the directors some little time since, on their own responsibility, borrowed this amount, in the hope that it would enable them to avoid the necessity of making a further call, and that they would soon be able to pay it back; but, unfortunately, this had not been the case. They had paid various little debts amounting to 111l., and the directors' fees were put down as a liability, as they had not been received.

Mr. HERITAGE asked whether the directors intended to relinquish their fees, as the shareholders had got nothing? The CHAIRMAN, in reply, said: In the present state of the company they would not further impoverish it by taking their fees, and as they had not taken the amount due to them when the company had funds in hand, he thought they might safely be trusted not to take them while the present state of things existed. He had too large an interest in the company to spend a shilling that could be saved for the development of the mine. That left them a balance of about 500l., and if Capt. Williams's expectations were realised he hoped that that amount might carry them through; but there was no use blinding the fact that that was all they had to rely upon, and that if the points should not prove successful the directors would very soon have to ask the shareholders to meet them to decide what was to be done with the property. He did not think it would be desirable to discuss the matter at present, because he had great hopes, from what Capt. Williams had told them, that they would be enabled to pull through. Besides the immediate operations there were other points which Capt. Williams had pointed out to them to be resumed, with a view to further development; but, of course, they had been obliged to restrict the manager as much as possible, and to cut down every expense that was not likely, in his judgment, to produce early results. Capt. Williams had effected great economies in every way possible, and was doing everything he could to make the mine successful. The shareholders were informed in the report that Mr. Hutchinson had been obliged to retire from the management of the mine, very much to the regret of the directors.

Mr. HERITAGE asked what proportion of the 6124l. for the costs of the mine was due to labour and materials? The CHAIRMAN replied that the amount referred to 15 months operations. Out of the 6124l. the wages absorbed 4052l., that was about 270l. a month; the machinery and merchants' accounts amounted to 2000l.; and the office expenses to 232l.

Mr. HERITAGE thought the item for office expenses very large.

The SECRETARY said the amount included the law charges and every expense connected with the reconstruction of the company, as well as the rent and other charges for 15 months.—The CHAIRMAN added that the secretary had consented for some time past to reduce the amount they had been paying him. The amount in the accounts included—besides the rent and general office charges—printing, stationery, stamps, registration fees, and law charges.

Mr. MANSELL remarked that although the lump sum seemed heavy, if the items were taken separately he did not think it would be found to be too much.

Mr. CARL said that with regard to the directors' fees he could not see any early prospect of their being paid, but he might state that Mr. Baxter and himself met nearly every day in the week at his office, and discussed the affairs of the company.

The CHAIRMAN, in reply to a Shareholder, said the last call had not been included in the balance-sheet, as it had not been made at the time to which the accounts were made up. He (the Chairman) then moved the reception of the report and accounts.—Mr. CARL seconded the motion.

A SHAREHOLDER asked what the present monthly costs of the mine amounted to?—Capt. WILLIAMS replied that they were a little over 200l. a month.

Mr. MANSELL asked if any returns of lead were being made at the present time?—Capt. WILLIAMS, in reply, said they were selling about 100l. of lead a month. In reply to a further question, he (Capt. Williams) said they had their own smelting works, and they always had a ready market for their lead in Pateley Bridge.

The CHAIRMAN, replying to a question with regard to the eastern portion of the mine, said they could not deal with this except upon a very restricted scale, and he did not think that at the present time they would be able to induce the shareholders or the public to take up the unallotted shares for the purpose of prosecuting the working of that part of the property.

Mr. HERITAGE asked at what depth from surface the pumping-engine was fixed?—Capt. WILLIAMS replied that it was fixed at a depth of 47 fms., and it was bought with the property from the private company which worked the mine previously to the late company. As the pumping expenses were so heavy he considered that the operations below the 30 fm. level could not pay at the present prices of lead, and therefore he advised the board to abandon them for the present in favour of prosecuting other parts of the mine. Capt. Williams then pointed out on the plan the various points of operation, and added that in the 20 he believed that they were within 15 fms. of the Lumb vein, which was one of the principal veins of the mine. In the neighbouring mines which he was working he had had no difficulty in getting down as he wanted, and if they had a shaft at this mine, with a proper engine at the top, it would, of course, be easy to keep the workings unwatered. He was perfectly satisfied in his own mind that in a few months the No. 3 vein would more than meet the costs. The workings had not been abandoned because of the want of lead, but entirely because the amount of water prevented their carrying on the operations at a profit.

Mr. ARTHUR said they had 7500 shares, could they not issue them at a discount to the shareholders, and raise money in that way to develop the property?

The CHAIRMAN replied that he thought they had better wait a little while, and leave it to the directors to do what they thought best to promote the interests of the company.

Mr. CARL remarked that the reserved capital was intended for the eastern portion of the property, and he did not think they should divert it. Of course, if they could work the eastern portion, or get some other people to work it, it would help them to unwater the part they were now working.

The report and accounts were then unanimously received and adopted.

This being the first ordinary meeting since the statutory meeting of the company, the directors, Messrs. Baxter, Carr, and Kitching, retired from office. On the motion of Mr. MANSELL, seconded by Mr. HERITAGE, they were re-elected.

On the motion of Mr. MANSELL, seconded by Mr. ARTHUR, the auditor, Mr. D. Norris, was reappointed.

The meeting then closed with a vote of thanks to the Chairman and directors.

#### SOUTH CONDUROW MINING COMPANY.

The four-monthly meeting of shareholders was held at the offices of the company, Austinfriars, on Wednesday.

Mr. H. J. MARSHALL in the chair.

Mr. JAMES HICKEY (the secretary) read the notice calling the meeting. The accounts for the past 16 weeks were also read.

Capt. RICH read his report, as follows:—

Aug. 10.—In reporting on the operations and prospects of the mine we beg to state that, having recently opened on the back of a kindly lode in the Lew ground directly to the west of Wheel Grenville, we sunk a trial pit on its course, and found it to be very promising, and likely to open out well at a greater depth, although it yielded good stones of tin nearly close up to the surface. With the view to prove this lode deeper we have cleaned up and repaired the boundary shaft, which is 30 fms. deep, and have started a cross-cut therefrom to intersect the lode referred to. In driving the 30 cross-cut south we have passed through a lode 2 ft. wide dipping north, and carrying a small leader of rich tinstone on the hanging-wall. We look upon this as a kindly indication, and are now urging on the cross-cut to intersect the lode seen at surface. There is another group of lodes in the new ground standing about 200 fms. south of the boundary shaft. These were opened on to some extent about 40 years ago for copper, and called the Polgine Mine. The adit leading to this part of the mine has been choked with rubbish for a considerable time. We have a set of men clearing and securing this adit, with the view to throw open the south or Polgine lodes for inspection at and above the adit level. The old rubbish heaps contain a little tin, which seems to have been neglected by the former workers in their search for copper.—Flat Lode: The 40 end, east of engine-shaft, is worth 12l. per fathom. The winze in the bottom of this level is worth 12l. per fathom. The 50 east of King's, is worth 9l. per fathom. The stope behind this end is worth 15l. per fm. The lode in the sink below the 50, west of Plantation shaft, is worth 12l. per fm. The 60 end, east of King's, is letting out water freely; and, although the lode is unproductive at present, yet it has a very kindly appearance for a speedy improvement. The 70 end, west of Plantation shaft, on the tin lode—which is in the new ground—has been disordered by coming in contact with another lode dipping in a contrary direction. We are now sinking below the 70 to prove the tin lode out of the influence of the lode referred to. We are putting out a cross-cut south in the 70, directly to the west of Wheel Grenville boundary, and towards the boundary shaft already spoken of. The lode in the rise in back of the 70 west has recently improved, and is now worth 20l. per fathom. This 80 is the farthest level driven east, consequently the lode is standing whole to surface over this place, and it is encouraging to see a good productive lode in the end. The 93 east is worth 12l. per fathom. There are two stopes behind this end worth 14l. and 18l. per fathom respectively. We have lately had to make some extensive and necessary repairs to the stamps, which caused a delay of a week in our stamping of tinstone, but everything is now in good working order both underground and at surface, and the prospects of the mine looking cheering.—WM. RICH, WM. WILLIAMS, HUMPHREY KING.

The CHAIRMAN said the shareholders had heard the reports and accounts read, which spoke for themselves, and, therefore, he need not make many remarks upon them, but if any gentleman had any remarks to make he should be happy to answer him, or Capt. Rich, who was present, would be glad to give any information in his power.

The report was very satisfactory, and showed that they were improving at both ends. They were going into virgin ground in the 80 east; there was a rise there over the 70 (which was near the old western boundary), which was improving, and becoming more valuable, and was now worth 20l. per fathom, and they knew that when Captain Rich got ends worth 20l. per fathom he generally began to return tin very freely. The accounts would show that whilst the price had rather decreased the returns had slightly increased, the returns having been 185 tons for the 16 weeks against 168 tons for the preceding 16 weeks, whilst the price had been 49l. 12s. 6d. against 57l. 1s. in the previous 16 weeks. The amount of profit made in the 16 weeks was 3147l., and the directors recommended a dividend of 10s. per share, which would absorb 3061l., leaving about 86l. to be carried forward.

It was the same dividend as was paid on the last occasion, which was at the rate of about 28 per cent. for the year, which he thought the shareholders would agree was satisfactory even for a mining company. In conclusion, the Chairman moved the declaration of a dividend of 10s. per share.

Mr. WESTON seconded the resolution, which was put and carried.

The CHAIRMAN, in reply to a question, said that the balance in hand after payment of dividend would be 2547l.; the balance brought forward from last account was 2461l. He might mention that the cost of getting the tin had been somewhat less.

Capt. RICH explained that this arose chiefly from the ore which had been dressed having been coarser.

Mr. COOPER suggested that the accounts should be sent to the shareholders a week before the meeting.—The CHAIRMAN said the accounts were only audited an hour or two before the meeting, and it could only be done by postponing the day of the meeting, which he did not think was desirable to do. At the same time if there was any general expression of opinion on the part of the shareholders in favour of the course suggested the directors would take the matter into consideration.

In reply to Mr. HARVEY, who suggested that more details should be given in the accounts, the CHAIRMAN said all the details were on the table, open to the inspection of any adventurer who wished to examine them.

On the motion of Mr. HARVEY, seconded by Mr. ROCKE, a vote of thanks was passed to the Chairman and directors, and the meeting broke up.

[For remainder of Meetings, see to-day's Journal.]

SWANSEA HARBOUR TRUST.—The report of the revenue of the Swansea Harbour Trust for the month of July is even more satisfactory than the favourable statements issued with regard to recent months. The revenue on the general harbour estate for last month amounted to 4566l., being no less than 1004l. in excess of that for the corresponding month last year. The augmentation is chiefly noticeable in the shipping rates and rates for goods, but there has been some increase in every branch of revenue except the rent of the low level line, which is a fixed sum. On the other hand, the expenditure for the month, amounting to 3414l., only showed an increase of 131l. The South Dock revenues show equally satisfactory features. The revenue has increased from 680l., the sum received in July last year, to 1109l. In this case also every variable source of revenue of any importance has been increasingly productive, but this is especially so in the case of the wharfage and cranes dues. At the same time, the ordinary expenditure has decreased from 1233l. to 990l. There is thus a surplus for the first month of the present half-year of 1241l. on the general estate, against one of 369l. last year, while on the South Dock estate a deficit of 552l. has been converted into a surplus

of 456l. During the first six months of the present year every branch of trade—coasting European, and beyond European—showed an extension compared with the first half of 1879.

#### PUDDLING AND HEATING FURNACES.

That a considerable portion of heat is wasted in the ordinary process of puddling is so well known, that almost innumerable attempts have been made to utilise it, but the effort has usually been to employ it for some work other than puddling. Mr. WILLIAM STUBBLEBIR, of Bethlehem, Pennsylvania, proposes, however, to re-use it in the puddling process itself. Some eight months since Mr. Stubblebir pointed out that the gaseous products of combustion are generated so rapidly and in such large volumes in puddling and heating furnaces whenever fresh air is introduced into the fire chamber that a large proportion of these products passes off unconsumed to the chimney, but by permitting a portion of the products to enter the storage chamber the instant they are generated they may be utilised during the intervals between the supplies or fuel by forcing them gradually by and with a current of air from the storage chamber into the fire chamber where the mixture of air and gas is ignited and passes off in a flame through the furnace. Not only is a saving of fuel thus effected but an intense heat is maintained in the furnace, and iron of a superior quality produced.

When the invention is applied to a puddling furnace, there is built on the roof of the furnace a structure enclosing a chamber which communicates with the interior of the fire chamber through openings in the roof, such openings being sufficiently large to permit the free passage through them of gases from the fuel. A blast pipe communicates with the ash pit of the furnace, and another blast pipe serves to introduce air into the upper chamber, the flow of air through the said pipe being regulated by means of a valve or damper. A perforated partition may be placed in the upper chamber, so that the air from the pipe may pass in the form of jets into the said chamber.

In working the improved furnace a very light blast is introduced into the ash pit instead of the usual heavy blast, the fuel being introduced into the fire chamber in small quantities and at frequent intervals, and the damper or valve in the blast pipe being closed during the introduction of each supply of fuel. From the bituminous coal or wood employed as fuel in the class of furnaces to which the invention relates, volumes of volatile gases are evolved immediately on the fuel being thrown upon the fire. These gases are generated so rapidly and in such volume that their complete combustion cannot take place in ordinary furnaces, a large portion passing off through the chimney in the condition of smoke.

In the improved furnace, however, a portion of the gases evolved on each introduction of the fuel finds its way into the storage chamber, from which it is forced by and with the air from the blast pipe into the fire chamber where the mixture of air and gas becomes ignited and intensifies the heat of the furnace, the gas and air being thus forced into the fire chamber during each interval or during a portion of each interval which elapses between the supplies of fuel, and preferably when the fuel in the chamber is in an incandescent condition. By this means such a high degree of heat is maintained in the furnace, and such a saving of fuel is effected, that more heats can be worked in a given time and at less expense of fuel than in ordinary furnaces, the puddled iron produced being at the same time of superior quality. It may be advisable in some cases to partly close the chimney damper for a short time, when a fresh supply of fuel is fed to the fire chamber. The air introduced into the storage chamber should be at a comparatively low pressure, so that the mixed air and gas may be gradually forced into the fire chamber.

It was quickly found that in practice certain modifications in this arrangement were necessary, and these were embodied in the improvements patented on Jan. 30. The chamber enclosed in the structure above the fire place is provided with a bridge which extends across it, and the chamber communicates with the fire chamber through two sets of openings in the roof, on which the bridge is built, one set of these openings being on one side, and the other set of openings on the opposite side of the said bridge. Across the interior of the chamber between the top of the same and the top of the bridge extends a horizontal partition, the rear portion only of which is perforated. A blast pipe is employed having two branches, one of which extends into that portion of the chamber which intervenes between the top of the same and the partition, whilst the other branch of the said blast pipe terminates in a chamber below the bed of the furnace, which chamber communicates with the ash pit, or the second branch may communicate directly with the ash pit as the construction of the puddling or heating furnace may suggest. Each of the branch pipes is furnished with a suitable valve or cock, so that air under pressure may be directed to the chamber above the partition, or to the ash pit, or to both.

When the furnace is in operation and the valve of the first branch pipe is open, the air introduced into the chamber above the partition will pass through the perforations in the same and downward into the fire chamber through one set of openings in the roof, and this course, pursued by the air, will induce the gaseous products of combustion with more or less flame at the front of the fire chamber to pass upward through the other set of openings in the roof and over the bridge where the gases will become mixed with the air, the latter being at the same time heated, and the mixture of air and gas will pass together through the rear openings in the roof into the rear portion of the fire chamber near the bridge wall, and will intensify the heat of the furnace. In feeding the fire chamber of ordinary furnaces with fuel, and especially if the latter be bituminous coal, much of the gaseous products of combustion will pass off unconsumed or partially consumed into and from the chimney, but in the invention described the volatile products of combustion are effectually consumed before they reach the bed of the furnace, and a great saving of fuel is thereby effected, while in puddling furnaces the iron is of superior quality.

In the regulation of the blast it is desirable that certain general rules should be observed. Immediately after the introduction of every fresh charge of fuel into the fire chamber the valve of the branch pipes should be so opened that the volume of air introduced into the chamber above the partition will be increased and that introduced into the ash pit decreased; the result of this will be the rapid ascent of the quickly generated gaseous products of combustion through the openings into the chamber, the gases being accompanied with more or less flame of a character which indicates the incomplete ignition of the products, which, however, on passing over the bridge become so intimately mixed with the air that their complete ignition is assured, as they re-enter the fire chamber near the bridge wall. After the charge of fuel approaches an incandescent condition and the volume of unconsumed gaseous products is decreased the upper blast may be reduced and the blast to the ash-pit increased until the furnace demands a fresh supply of fuel. This method of inducing the unconsumed or partially consumed gaseous products of combustion to pass from the front portion of the fire chamber by means of compressed air, and of returning the gases mixed with the air to the rear portion of the fire chamber near the bridge may be carried into effect by structures differing from that described.

Modifications of the structure over the fire-place will of course be necessary in many cases so as to adapt it to the character of the furnace to which it is applied, but the general principle is always the same. For example, the bridge is not absolutely indispensable, or it may be carried up a very short distance, but the blast should be introduced into the chamber at such a point, or the perforations in the partition should be so arranged, that the air will force the gases downward into the fire-chamber near the bridge-wall while it induces the gases and flame at the front of the fire chamber to enter the gas chamber. The object of the perforations in the partition is to subdivide the volume of air that its intimate admixture with the gases may be assured.

COPPER ORES.—The decrease of copper ores sales at the Cornish ticketings is illustrated by the fact that during the year ending June 30, 1862, 186,662 tons of 21 cwt. each of copper ores, valued at 977,017l., were publicly sold in Cornwall, while in the year ending June 30, 1880, there were only 40,525 tons, valued at 152,902l.



## Lectures on Practical Mining in Germany.

CLAUSTHAL MINING SCHOOL NOTES\*—No. CLX.

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In addition to the loss of power arising from the friction of the air against the sides, a great loss is occasioned by the fact that the air current passes through openings of constantly varying section, and also with very sudden changes of direction.

When the air current emerges from a level or roadway into a very large open working place, or a goaf, the velocity is suddenly diminished, and owing to this a loss of ventilating power, proportionate not merely to the difference but as the square of the difference of the velocities. The particles of air emerging from a roadway, with a considerable velocity may be considered as coming into collision with the more slowly moving particles in the goaf or working place, and that after the collision they move forward with a common velocity. The power which is thus lost as ventilating power cannot, of course, have been annihilated, and must be looked for in the eddies and disturbance of the air near the entrance of the roadway. If the roadway opens with a gradually increasing section into the goaf or tank these eddies may be avoided, and the loss due to them considerably lessened, a greater proportion of the power going to increase the velocity of the more slowly moving air current.

Again, when the air current passes out of a bank or goaf into a narrower roadway, a sudden change (increase) of velocity takes place, and there is a corresponding loss of ventilating power, this loss as in the former case being proportional to the square of the difference of the velocities. If the roadway emerges suddenly into the working place or goaf, the loss is still further increased, owing to the contraction of the sectional area of the air current.

A still greater loss of power is caused when the air current suddenly changes its direction at right angles, which often occurs in mines. The particles of air passing round a corner do so in curved lines, and the centrifugal force causes the air to pass more along the furthest side. That this is the case will be at once evident if the velocities of the air in different parts of the bend are observed with an anemometer. A contraction of the section of the air current takes place, the velocity is increased on the outer side of the bend, and the loss of power may be traced to the formation of strong eddies at the bend, and to the increase of the velocity at the bend. At a considerable distance past the bend the velocity becomes uniform over the whole section, of course much less than that at the bend. The loss varies according to half the angle expressing the change of direction. In the case of a bend at right angles the loss of ventilating power is nearly equal to that corresponding to the velocity (i.e., to that required to impart the velocity to the air current).

The above rules cannot well be applied to calculating the loss of ventilating power in mines, due to sudden changes of section and of direction of the air current. They show, however, the great advantages which may be expected by connecting main roads (at right angles to one another) by means of well executed curved roads, and where curves of any size cannot be made by rounding off the corners. In some of the collieries of the North of England the main engine clips and rises are connected with the main level engine plane by curves of three to four chains radius.

## ARTIFICIAL VENTILATION.

We have seen where the ventilation is dependant on natural differences of temperature and density of the two air columns, that in most cases, at certain seasons of the year, not only may total stagnation occur, but even a reversal of the air current may be the result. In coal mines a constant current is necessary, and in metalliferous mines certainly advisable; whilst a reversal of the air current may take the powder smoke through portions of the mine where it would be extremely inconvenient. We have said that any motion of the air current is due to a difference of density of the air at the entrance and at the exit of the mine. This difference may be brought about

1.—By increasing the difference in temperature, either warming the returning current or cooling the intake current.

2.—By increasing the difference in density by mechanical means, either rarifying the return current, or compressing the intake current.

## INCREASING THE TEMPERATURE OF THE RETURN AIR CURRENT.

For merely temporary purposes the burning of straw or other material in or near the bottom of the upcast shaft has been adopted. The oldest method is, perhaps, that of suspending an iron basket or pan in or near the bottom of the shaft, filled with burning coals. The basket was often suspended a short distance in the shaft, so that the hanger on was not molested by the smoke, the basket being lowered whenever the fire became low, to be made up afresh.

In other places the fire-pan was mounted on three legs, and placed in the level close to the bottom of the upcast shaft, being fed at intervals by the hanger on. Where the ventilating power required is not great, and steam power is employed at the surface for pumping or winding, it is not unusual to cover the mouth of the upcast shaft, and to lead the return air current by a short air drift to the bottom of the chimney. This plan is often adopted in sinking pits, the division boxed off for the return current being connected with the chimney. In mines giving off light carburetted hydrogen, and sinking through strata in which the same gas has been met with, the above methods have led to explosions. They are also only applicable in those cases where but little ventilating power is required. For mines which require a constant and powerful current a proper furnace must be built. The furnaces are best, and most usually, built underground, although also at and near the surface.

Furnaces built near the surface have been employed in the Mons district. The return air current from the workings ascends towards the surface along a series of short shafts or winzes, down which the miner descends by means of ladders. The mouth of the upcast shaft is closed, and the air compelled to traverse along a short drift to a furnace 12 to 16 ft. below the surface, over which a brick chimney is built. The air is carried through the furnace, and, therefore, warmed by direct contact with the flame. Among the brown coal mines in Saxony the furnace is often placed at the surface, and connected by a flue on the surface with the mouth of the upcast shaft, which is otherwise covered in. The end of the flue terminates beneath the ash-pit of the furnace, the air thus passing direct through the furnace. Sometimes the return air current contains such a proportion of carbonic acid that the fire burns too slowly. To remedy this a nearly vertical flue passes from the horizontal flue into the chimney above the furnace. This vertical flue contains an ordinary damper, so that when closed the return air current must pass from the shaft through the furnace. When the return air current contains much carbonic acid the damper is left open, and the return air current passes at once into the chimney above the fire, the fire being now fed by fresh air. The height of the chimneys is about 40 yards.

The above arrangement of furnace is inapplicable where the return air current is liable to contain sufficient light carburetted hydrogen to render it explosive. To avoid this risk the furnace at Searing was so constructed that the return air current could not come in contact with the flame of the furnace. The fire-place was formed in the bottom of a cylinder of sheet-iron, surmounted by a sheet-iron chimney, the latter being provided with a damper. The sheet-iron cylinder forming the furnace is placed within brickwork, so that a sufficiently large space exists between the outside of the cylinder and the brickwork. The space inclosed by the brickwork communicates at the lower and upper end by openings into the upcast shaft. The sheet-iron chimney passes through the roof of the brick enclosure. The brickwork near the bottom of the sheet-iron cylinder is so arranged that the furnace door is open to the air, and all access from the space between the cylinder and brickwork to the furnace door is shut off. A portion of the return air from the upcast shaft enters in at the lower opening, and passing round the sheet-iron cylinder, in which the fire is placed, becomes heated, and finds its exit at the

upper opening, giving up part of its heat, and increasing the velocity of the upcast current. The same principle is used in the construction of some ventilating furnaces placed at the surface of the mines at Obern Kirchen. The mouth of the upcast shaft is closed, and communicates by means of a large flue with a tower or chimney over 50 ft. in height. The flue joins the chimney at some height above the ground. The lowest part of the brick chimney is much smaller in diameter than the rest, and in this the fire-bars for the furnace are laid. Where the section of the inside of the chimney suddenly enlarges a ledge is formed, on which a couple of cast-iron rings are placed, and upon these a long cast-iron cylinder, which terminates with a cylinder of much smaller diameter than the chimney, the latter projecting about 4 ft. above the top of the brick chimney. The flames of the furnace play upon the inside of the larger iron cylinder. The return air current passes upwards along the annular space between the cast-iron cylinder and the brick chimney. Of course, care must be taken not to allow the flame to burn through the iron cylinder, which has on one or two occasions led to the ignition of the return air current.

Ponson gives the following as the results obtained by furnaces at or near the surface:—At the Pits No. 11, Grand Hornu Collieries: Height of chimney 46 yards, section of chimney 16 square feet, atmospheric temperature 3° C. (also 16.5°), quantity of air 4150 cubic feet per minute (also 3350 cubic feet per minute for 16.5° C.), useful work 237 horse-power (also 2 horse-power), coal consumed in 24 hours 1568 lbs. and 1476 lbs. respectively. At Pit No. 6 height of chimney 43 yards, section 15 square feet, temperature at surface, 3.75° C., volume of air passed 2700 cubic feet per minute, useful work 196 horse-power, coal consumed in 24 hours 2600 lbs. At No. 1 Pit, Sau-Wartan Colliery: Height of chimney 29 yards, section of chimney 25 square feet, volume of air passed per minute 4400 cubic feet, useful work 23 horse-power, coal consumed per 24 hours, 2387 lbs. The average of these four examples gives 3700 cubic feet of air per minute, 2013 lbs. of coal consumed per 24 hours, or in one minute 1.4 lb. And for 1 lb. of coal burnt for 24 hours a ventilation of 1.85 cubic foot of air per minute, or each pound of coal burnt propelled 1260 times its weight of air out of the mine per minute.

From the above it will be seen how small is the effects of this arrangement of a ventilating furnace at the surface. Moreover, as the building of a tower from 40 to 55 yards in height is necessary, the arrangement is an expensive one in all respects. Where the mines are deep its usefulness is comparatively less than with shallow mines, and the arrangement scarcely recommends itself for temporary or occasional service where it is specially necessary to erect a chimney.

As a useful auxiliary in cases where a great amount of ventilation is not required, the method of exhausting steam into the chimney, as practiced at some of the mines in the Liège and Hainault districts, may be useful. Generally the exhaust steam from the winding or pumping engine is carried to the bottom of the chimney connected with the upcast shaft. When the engine is standing the steam is led along a copper pipe direct from the boilers. The nozzle of the pipe used is from 1/2 in. to 3/4 in. in diameter. The useful effects of this method is even less than that of a furnace, so that its use is undesirable if any great amount of steam has to be specially generated. According to some experiments by Mr. Coombes, the increase in velocity was less than one-fourth that due to natural ventilation.

The use of a furnace at or near the surface with a chimney for producing the ventilation was formerly common at some of the Staffordshire pits working the 10 yard seam at a time when only one shaft was used in connection with each mine. The return air current was carried along a vertical flue built close against the shaft. The shaft, which was used for winding, served for the intake current, the current passing at once to the levels and workings in the lower parts of the seams, and returning along those in the upper parts. The vertical return flue was often square in section, and of much smaller dimensions than the shaft, generally 3 ft. by 2 ft. The upper end of the vertical flue is connected by a short horizontal flue with the chimney for the steam-boilers.

## EXPLORERS' AND ASSAYERS' COMPANION.

The Explorers', Miners', and Metallurgists' Companion, published in California by an esteemed correspondent of the *Mining Journal*—Mr. J. S. PHILLIPS, M.E., now of Wall-street, New York—was noticed a few years since, and its sound practical utility has secured it so favourable a reception that two editions have already been exhausted, and the first volume of a revised and enlarged third edition\* has now been issued. It will be gratifying to Cornishmen to learn that the author of so useful a work, although permanently settled in America, is one of themselves, being a native of Porth Towan, Illogan; and it is not unlikely that his experience gained in Cornwall largely assisted him to secure such a prominent position on the other side of the Atlantic. No subject, as Mr. Phillips truly remarks, can be selected where a really practical book is so much needed as in the various fields of mining for the assistance of those who have not been educated to this work, as more knowledge of the several trades and professions is required in the development of mines than for any other business. Worst mistakes of young miners have, in Mr. Phillips's opinion, occurred for want of ordinary prudence in this unusually difficult occupation. Instead of employing men with practical ability and experience, interloping clean-fingered theorists have been much favoured; and these, having discarded real mining for deficiency of skill in that department, have played recklessly with new ideas of metallurgy, or worked prematurely where insufficient mineral existed, and far too often not only wasted the last shilling of working capital, but caused severe retardation to systematic mining. It may, he remarks, be loudly reiterated for everlasting advantage that reduction works should not precede, but succeed, the discovery and exposition by mining of sufficiently rich and extensive deposits of mineral for positive realisation of profits.

Passing over the introductory chapters which deal with the questions of the formation of the earth from its initial chaotic state to the solidification of its primitive surface and granitic mountains, the formation of the first clay-slates, greenstones, and the various fine-grained hornblende and felspathic mixtures from primitive rock elements, and the rock formations of the palæozoic, mesozoic, and caenozoic times, an interesting chapter is reached on auriferous and stanniferous gravel deposits, in which Mr. Phillips states that placer gold is found either lying on the surface or slightly covered by earth or gravel in higher positions than the ocean beach auriferous gravels frequently on high beaches, and even on the very tops of considerable hills, where it would be simply absurd to suppose that it originated from veins. For the above reasons, and the fact that veins are mostly absent and do not contain the same kind, shape, or quality, or anything like a sufficient quantity of gold for supplying that in the gravel, whilst platinum and other infusible metals, also soluble in chlorine, are found in gravel deposits and never in veins, Mr. Phillips thinks that most of this gold was either washed out from the mountains during disintegration, or has been precipitated from its chloride solution by sulphate of iron or some organic substance to aggregate upon the surface and get rounded during the subsequent agitation of the gravel. The alluvial tin streams of Cornwall differ from the gold fields of California in having very much less quantity and depth of gravel. The oxide of tin from this source is always pure, and very different from vein tin, which contains impurities of sulphur, arsenic, &c. It is remarkable that tin is also soluble in chlorine, and is found in the alluvial deposits of Banca, where veins are not supposed to be present in the mountains. In the next chapter Mr. Phillips gives some new theories to account for earthquakes, which will be read with interest by seismologists.

The consideration of the formation of true fissure veins occupies the next chapter. Mr. Phillips's theory bears, he says, no resemblance to that of Werner, who thought that the mountains and their immediate sides may have settled unequally during hardening from the aqueous formation of the strata. His theory is founded on the idea

\* "The Explorers' and Assayers' Companion: Rocks, Veins, Testing, and Assaying." Vol. I. (complete in itself) of the third edition of the Explorers', Miners', and Metallurgists' Companion—a practical exposition of the various departments of geology, exploration, mining-engineering, assaying, and metallurgy. By J. S. PHILLIPS, M.E. San Francisco and New York: The Author. London: Trubner and Co., Ludgate Hill.

of hard rocks being fractured by the enormous leverage of side weights from subsidence of plains or ocean beds which may extend many thousand miles away in all directions. After referring to intervening veins between different strata in close contact with each, gash veins, cross-courses, slides, and dykes, there are some interesting observations on carbonates, bonanzas, pockets, floors, and deposits. Carbonate is a word much used in the West of Cornwall for pockets of tin ore that are found on either side of the lodes in the adjacent country rock, which are connected with the otherwise mineralised veins by very small strings, vughs, or branches, which enlarge suddenly to form the carbonates. The expression is confined to such positions and to the more compact bodies as offshoots from an otherwise generally mineralised vein, and not to branches, isolated pockets, or separate deposits. Although such have been found all over Cornwall they are more particularly displayed in frequency, size, and riches in the districts of St. Ives and Lelant, where the otherwise moderate ordinary profits derived from the lodes are sometimes increased to an extraordinary degree by these carbonates. These districts may be considered one, as they lie connectedly on the northern, eastern, and southern slopes of a granitic crescent formed by the several small mounds, Knill's Steeple, Rosewall, Trencom, and Trink Hills. At the eastern end of Rosewall Hill the Rosewall Hill Mine is situated, and these veins continue east into the St. Ives Consols Mine, which has yielded large profits from the principal lode, as frequently assisted by numerous extraordinarily extensive ramifications of small but rich network veins and these carbonates. One of the latter happening to be under the house of a poor man (of probably but 1-18th of the total value), placed him suddenly in luxurious circumstances. These veins then pass through Wheal Trenwith into the sea. The next celebrated carbonate mine is the Wheal Providence, on a parallel lode situated about one mile south from this, which runs from Knill's Hill into the sea, their profits and market value having been repeatedly influenced by similar discoveries. The flanks of these hills have been much broken or crumbled, and the rock adjoining the veins is often found decomposed or decomposing.

The bonanzas of Mexico are also unexpected prizes, having a similar but more extended meaning in mining, as they apply to all positions in the stratum, both when attached and detached from veins, and are much more important for gold and silver, as less space will contain considerably more value. Pockets lack venous appearance and continuance, are of irregular shape, and occupy all positions away from veins in the country rock. Floors differ from these by filling the spaces left between horizontal faces of the stratum or strata, and are often very extensive and valuable, more particularly for coal and iron ores beneath the coal measures. And, lastly, deposits are defined by Mr. Phillips to be such as must have been concentrated by the sublimation, alluvial water washing, infiltration, or precipitation of considerable quantities of minerals on a certain spot or into a suitable receptacle of bed rock. The next chapter treats of the supposed actions and reactions that have been and are continually taking place in mineral veins, pockets, and deposits, of how minerals were formed, and how gold, platinum, and similar metals were formed; and there is then a chapter on the peculiar characteristics of true fissure veins and their constituent combinations, positions, directions, and dips, general comportment when traversing different strata when forming intersections and junctions with each other or with cross-courses, dykes, and slides, the influence of cross-courses, slides, and dykes, and a summary of the effects produced by these collective causes. The ninth chapter is one which will prove to be of general interest to miners and prospectors, since it treats of the more generally recognised premonitory indications from the shallow portions of veins for probable increase of mineral within the deeper sections.

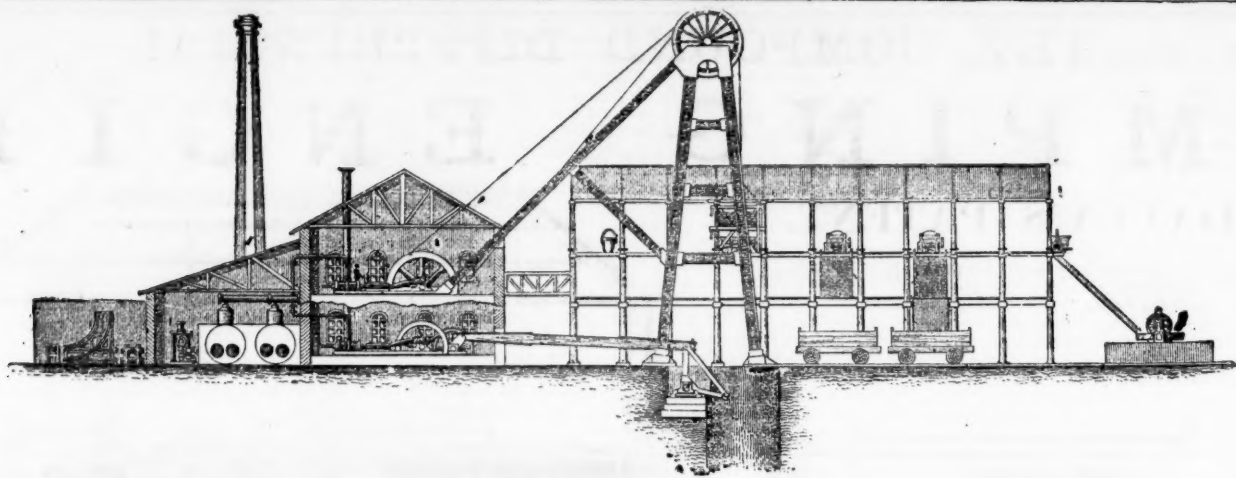
Referring to mineral reefs or "zones of stratum," which form the subject of the following chapter, Mr. Phillips remarks that many profitable mines have been found in mineral-bearing reefs of tilted strata where no veins of the ordinary characteristic features and forms existed; although the nature and kind of the rock itself and general requisite of the surrounding country were the same in all the necessary conditions as would have been required for minerals deposited within the walls of regularly well-defined veins. The best known instances of such mineral-yielding formations are those of the cinnabar mines throughout the world, which are generally found in belts and patches of rock of a more or less steatitic or talcose nature, which may range from compact talc (steatite) to talcose clay-slate, shale, or schist, and in rare instances to even sandstone. As to other mineral deposits in a stratum, he observes that the numerous mines worked in the suitable limestone lead measures of Wisconsin afford another variety of such hidden irregular pockets where veins proper form no direct or indirect feature of or cause for their riches, and where unguided blind chance must stumble upon the prize by dint of industrious perseverance and search by random drifts in the supposed more congenial portion of the stratum. A deposit of galena being found and worked out, the threads, seams, or small pipes or indicative stains are then often followed, which sometimes lead to other similar deposits. These have been mostly found in the naturally stratified rock formations, but there are many instances in the more western of the United States where very thick reefs of tilted strata have produced large quantities of mineral, and one particularly remarkable instance in the State of Nevada of the large mineralised reef or zone from which the Eureka and Richmond Mines have obtained their rich argentiferous lead ores and considerable profits. It appears from recently afforded legal evidence that their general excavations beside, within, and across the great breadth of the reef itself and through the ore ground, have clearly shown that the mineral extended hither and thither to every direction in most irregular deposits, which sometimes lay for short distances by the side, but more frequently interlaced the general bed rock of the reef. In this case it did not appear that the minerals either showed the usual book-like laminations of veins, or that they were contained in or surrounded by the ordinary vein matrices. In such like formations there may be a more or less general percolation of gases and waters, and consequently connections by very small and obscure natural pipes and seams must also prevail, but they do not show any other resemblance to regular veins.

Such is a brief sketch of the first 118 pages of the volume, and will suffice to give an idea of the general style and thoroughly practical character of the work upon which Mr. Phillips may fairly be congratulated. The second section treats of exploration, and will be dealt with in a subsequent notice.

FATAL ACCIDENT TO AN OLD MINER.—Mr. John Jones, aged 75, of Navarino-road, Dalston, a mining engineer, who had been the captain of mining expeditions in various parts of the world, was crossing Gracechurch-street, when to avoid the horses of an omnibus which had just started, he stepped backwards and was struck down by the shafts of a hansom cab, and before he could be assisted was run over by the rear wheel. On examination at Guy's Hospital he was found to have sustained a broken thigh, several fractured ribs, and other minor injuries, which inducing inflammation of the lungs resulted in his death.

EXTRACTING METALS FROM ORES.—In order to disintegrate and desulphurise ores, so as to bring them into proper condition for easy pulverisation, and the precious metals contained therein into a suitable form for amalgamation, by freeing them from the union and influence of baser metals, the ore is, according to the invention of Mr. T. C. CLARK, of Oakland, California, crushed into pieces about the size of ordinary Indian corn. That portion containing sulphurets generally becomes finer, since it is more friable. The object of crushing it to this size is to prevent loss of gold and facilitate the washing operation. The ore, after being crushed as described, is placed in an ordinary roasting furnace. After being roasted for a suitable length of time, the heat is raised, so that the sulphur will burn freely, after which the heat is let down again, a free supply of oxygen being furnished during the whole process of roasting. After the ore has become dead and lies like sand in the furnace, and no more scintillation is apparent, it is heated up to a good red heat, but not made too hot. In a suitable receptacle beside the furnace a cold bath is formed, in which the ore is drawn while in its heated condition, fresh from the furnace. This bath is formed of a solution of salt, prussiate of potash, and caustic soda or caustic potash.





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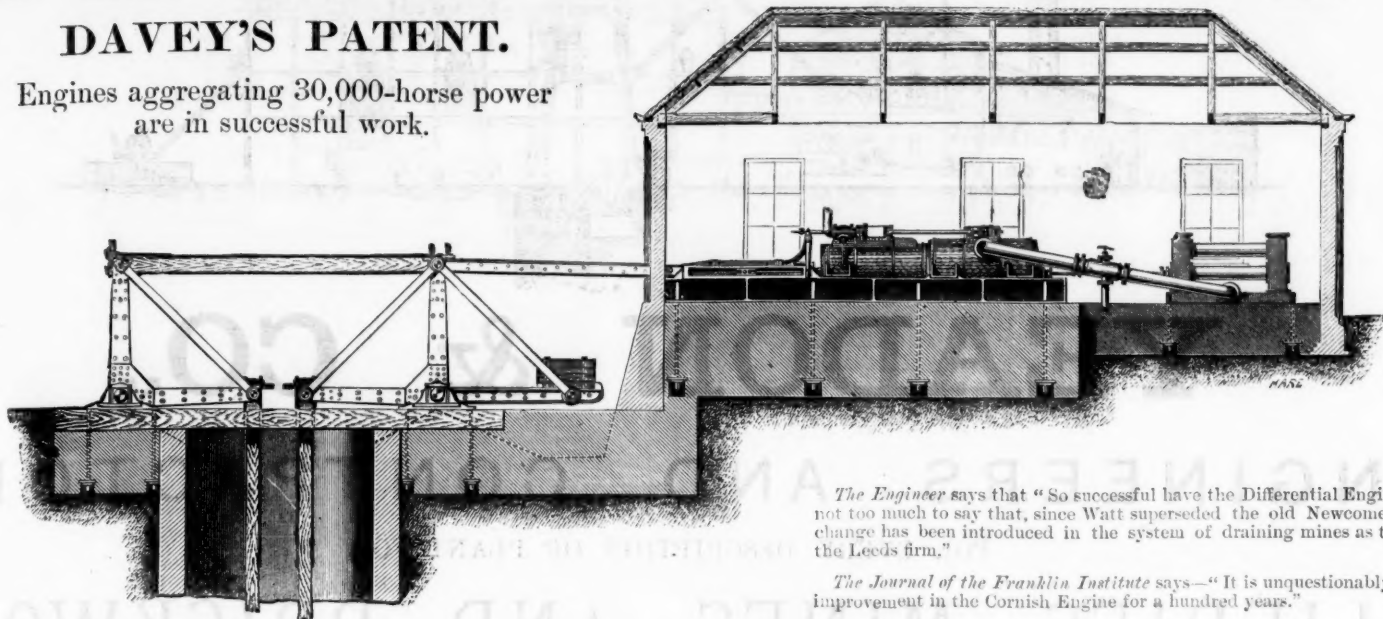
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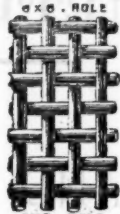
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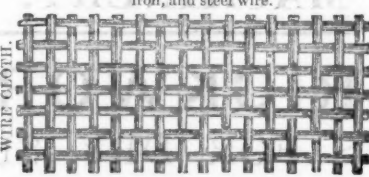
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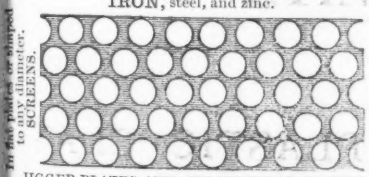
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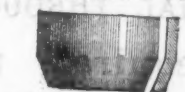
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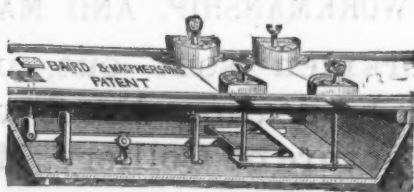
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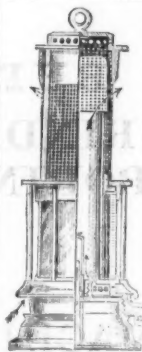


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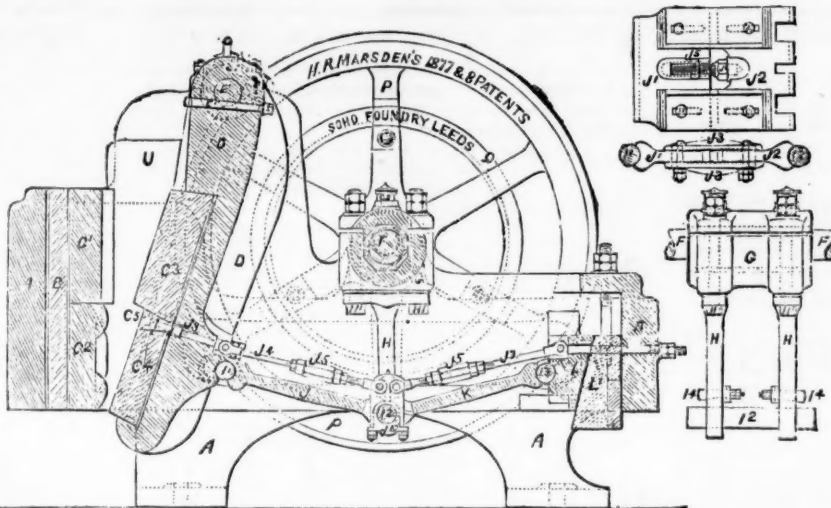
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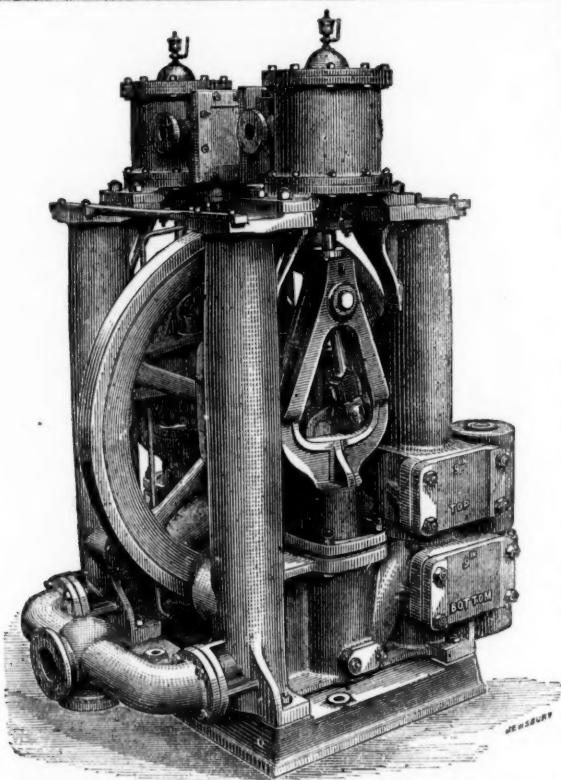
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perience of the relative economy of machine and  
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Hockin was £180, and adding to this the cost of  
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of the Breaker in working order was £500. By this  
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